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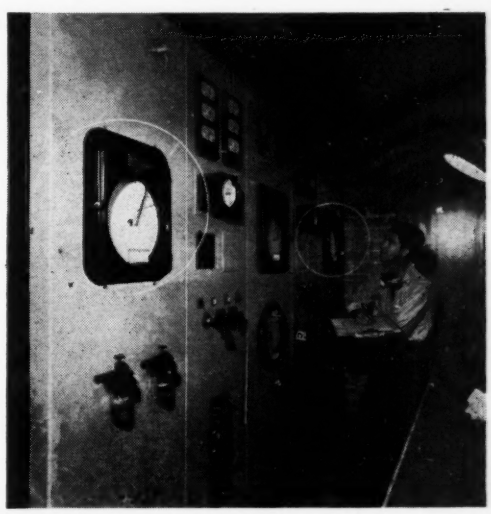

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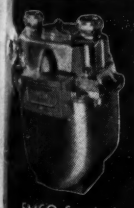

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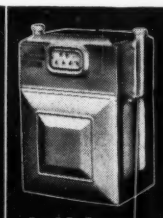

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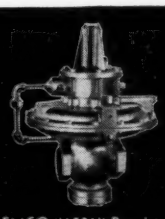

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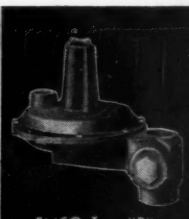

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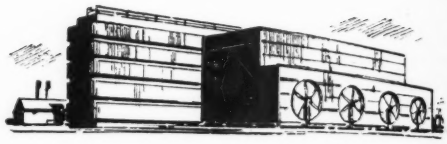

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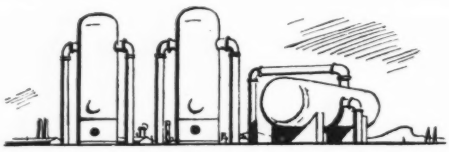

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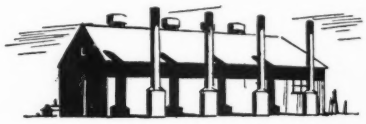

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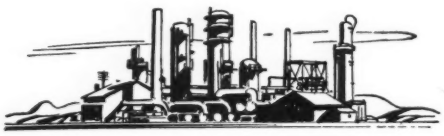

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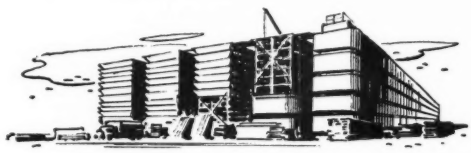

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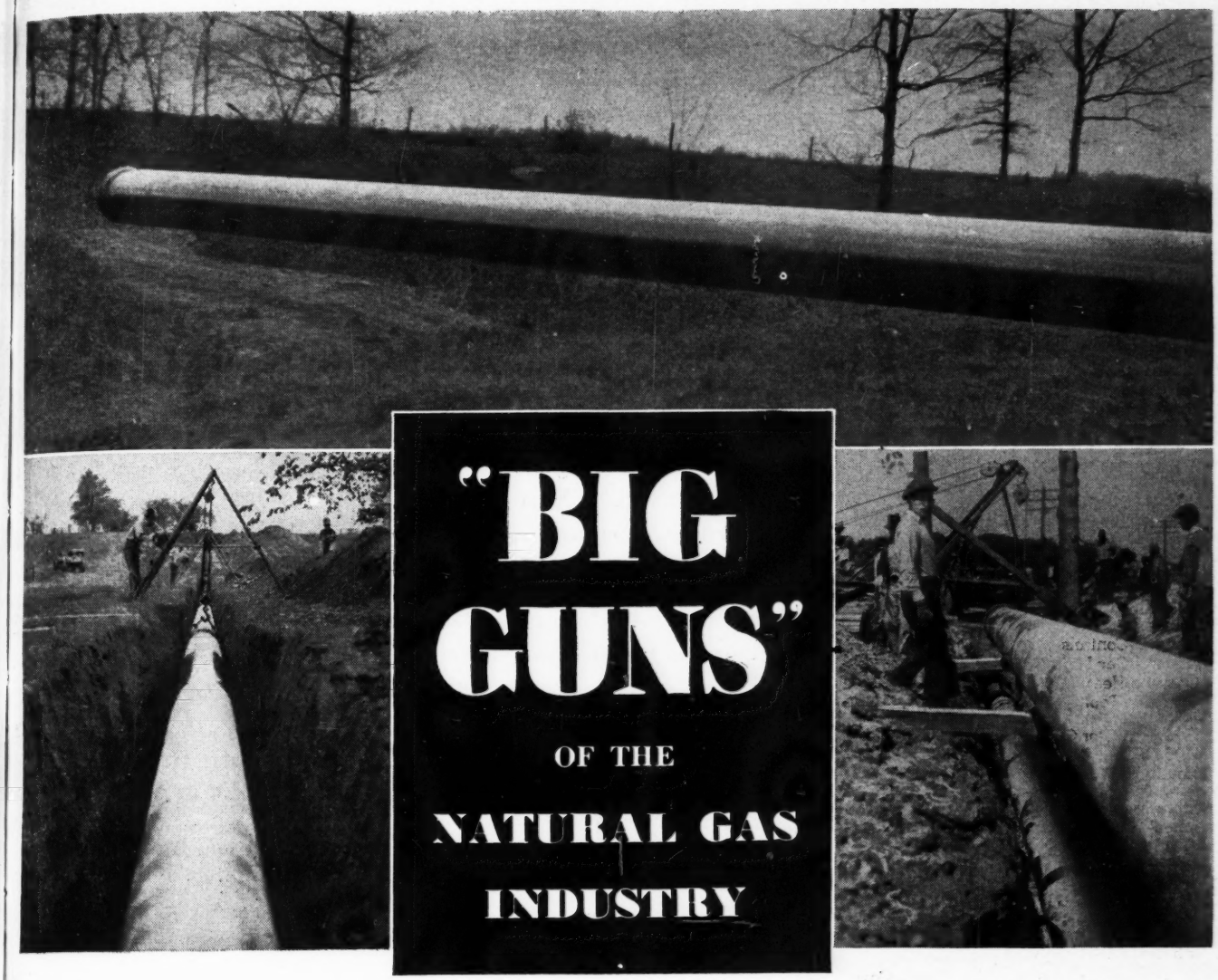

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Twentieth Year of Publication

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GUEST EDITORIAL

The Fifth Freedom

By C. H. ZACHRY

Executive Vice President

Southern Union Gas Co., Dallas, Texas

WE HAVE heard much during the past year of the so-called Four Freedoms: Freedom of Religion, Freedom of Speech, Freedom from Want, and Freedom from Fear. The first two are familiar to us all. America was colonized as a result of the desire of our forbears to find freedom of religion and freedom of speech, and nearly all our wars have been fought either to establish or to protect these liberties. The latter two, Freedom from Want and Freedom from Fear, are not so familiar and are considered more idealistic than real by most of us.

There is a Fifth Freedom, however, which is very real and precious to all Americans. If America is to remain American, this fifth freedom must be cherished and protected.

It is the Freedom of Individual Enterprise!

What is meant by freedom of individual enterprise? It means freedom of the individual to use his own ability and initiative, without undue and unnecessary restraints from his government, to make of his life the full success of which he is capable. It means that a rail-splitter, born in a log cabin, may become President of the United States; it means that an oil field mechanic may become a great manufacturer; it means that a bicycle mechanic at 40 may, at 60, be one of the world's greatest industrialists. It is the system by which the office boy knows that he may by his own efforts and initiative become the president of his company. It is the system under which a man may go into any honest business he chooses. It means he will succeed or fail, according to his abilities and effort. It is, in short, the American way. The way that has made America the greatest nation on earth.

As a necessary part of carrying on the war against the enemies of all liberties, it has been necessary for us to suspend, for the duration, some of our own precious liberties. Particularly freedom of individual enterprise has been affected. Through government restrictions, shortages of material and labor, rationing, price controls, etc., many small businesses have been closed—some for the duration and some, unfortunately, permanently. Larger plants are principally engaged in war production, to a large extent under government control. Freedom of operation of all businesses is necessarily greatly curtailed.

All of us realize that restrictions—yes, even regimentation—are necessary in war time. But the people of America must not be allowed to forget that freedom of individual enterprise, the Fifth Freedom, if you please, has made America the great nation that she is, and that we won't deserve victory if, in defeating the enemies of freedom, we allow the eyestone of the arch of American freedom to become a casualty of the war.

America, the new world, founded upon individual liberty and built upon freedom of individual enterprise, has, more than any other nation, retained, even in war time, the essence of that freedom. We must retain the liberties we have and, as soon as the war is over, recover those that we have given up for the duration. We may come to the fork of the road of democracy at the end of the present conflict with the Axis. One signpost may read "collective security" and the other "self-reliance of the individual." Americans must be ready to meet this situation and to take the right road.

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BACK THE ATTACK BUY WAR BONDS

Thermally Thinking

By ELLIOTT TAYLOR, Washington Editor

AGA Reorganization

As a member of the American Gas Association we have duly recorded our vote in favor of the amendments to the constitution and by-laws of that organization, and registered our formal approval of the acts of the executive board in making appointments to head the newly created manufactured gas and natural gas departments pending the election of their successors.

This as a gesture in affirmation of the recommendations made by J. French Robinson and Ernest R. Acker, the special committee on organization, is no less than their due, and we share with all of AGA's well wishers the hope that out of the changes may emerge a new spirit in gas association affairs which will remold this institution into a truly representative body of all the gas industry, and will establish for it in the ranks of American trade organizations a position of authority and leadership that in late years has been lamentably lacking.

Reduced to simplest terms, the changes in organization structure now being promulgated are an effort to salvage from the growing discontent and dissatisfaction of the natural gas segment of the industry some measure of revived confidence in the competence of the direction of the AGA. Discontent with the association is not exclusively a matter of preoccupation of natural gas representatives. But it is from natural gas that there has come the greatest amount of criticism. Perhaps because of their predominantly western origin, or perhaps because they represent a newer and a more vigorous concept of gas utility service and the opportunities that it presents, it is the natural gas executives who have grown restive under the ultra conservative, the almost reactionary pattern of AGA operation.

Separate Organization

It certainly can be no secret that right now a sizable and influential group is considering the advisability of forming a natural gas organization, separate and apart from the AGA as the only feasible method by which their branch of the gas family can be given an effective voice and be elevated into a position of influence as an industry. We have seen over the past few years too much evidence of the need for more adequate presentation of the natural gas outlook to dismiss this disaffection as a transient phenomenon, and we are too well acquainted with the caliber and the capacities of the men behind it to write them off as irresponsible malcontents.

Whether or not the organizational changes in the association will show sufficient promise to avert the completion of the schism that has already driven deep remains to be seen. We well understand and sympathize with the viewpoint of the natural gas men who have been driven by the force of events to the conclusion that the maintenance of continued allegiance to the AGA is fraught with neither hope nor promise, and we share in a large measure the impatience that many have expressed over the continuing policy of an organization which appears destined to remain hopelessly behind the times.

Yet, all of this notwithstanding, we cannot in candor abet the complete separation of the two great gas groups into individual organizations as anything save a last desperate resort. The rigorous and trying times through which we are now passing, and the uncertain future that lies ahead for all industry, are strong arguments for a greater rather than a lesser degree of unity in trade and industry ranks than has ever existed before.

Now, if ever, is the time when all industry must bury its intramural differences and present a united democratic front to a nation that has been slowly but cumulatively poisoned with the doctrine of centralization. This country of ours has traveled a long way toward the acceptance of the concept that the sum total of all social good resides in the centralization of authority, with all of the rights of individual endeavor remanded into final executive custody. The gas industry, now so preoccupied with its fears of what the competition will do, may live to see the day when it will pray God for the right to have competition, and to be competition under the principles of free enterprise. Even the nebulous and timorous post-war plans that have been blown up to such forensic significance are all contingent on the big If—If Washington will permit. . . . And we have seen the spectacle of those who once boldly asserted their demands for justice now resting their case on the craven's plea for mercy.

Unity and Harmony Essential

Only the strongest conception of unity, vigorously and unremittingly asserted, will serve to avert the post-war regimentation of all industry, and since few would deny that the heavy hand of bureaucratic control falls on the public utilities first, the greatest need for such unity must exist within our own ranks. Because this is true, and because the greatest outward evidence of unity within the gas industry is to be found in harmonious and enlightened cooperation between the manufactured gas and the natural gas interests, we believe that every effort should be made to bring into accord any reconcilable differences in viewpoint.

Knowing well the temper of the natural gas industry, we are under no illusions that the minor constitutional changes in themselves will be sufficient to effect this reconciliation. The new plan of AGA organization can be either one of two things:

(1) It can be in effect nothing more than a surface readjustment of the ostensible evidences of control or

(2) It can be the genesis of a real reorganization which will change the whole tenor and direction of the association's official outlook, elevating it to a position on a par in prestige and standing with those associations that represent the other fuel and power industries of the nation.

Bold strokes and firm and farsighted action will have to be taken by President Acker and by the heads of his manufactured and natural gas departments if the more desirable of these two alternatives is to be realized. A disinterested and critical appraisal of both the strength and the weakness of the American Gas Association must be made the

basis for continuation of any present practices which are sound, as well as for radical alteration in those policies which have outlived their usefulness. Departmental, sectional and individual activities must be appraised without sentimental or personal bias, and where need for change is apparent, those changes must be recommended without fear or favor.

To the small degree that our own cooperation may be of assistance in effecting a rejuvenation and a revitalization of the association in the interests of the entire gas industry, we pledge that cooperation in advance to anyone who may consider it worth the asking.

Good Intentions

APPLIANCE manufacturers have lately been politely needling their gas utility friends and one-time customers into some expression of attitude toward the merchandising of gas appliances come the day when manufacturers into some expression of attitude toward the merchanisded.

Then the gas companies suggest that statements from the manufacturers on the subject of their contemplated distribution plans would help utilities to chart their courses in the post-war selling plans that seem to be still pretty much in the buzzing-around stage.

We believe it would be very helpful to one and all if every manufacturer and every utility would sit down right now and advise the industry and the world at large just what is going to be done after the war. We also believe it would help a lot if MacArthur would advise us exactly as to the day when the war will end. But the traditional imponderables of war would make any such predictions meaningless, and would certainly brand prophets who undertook them more than a little ridiculous in the light of future events.

As far as the gas utilities are concerned, there never has been any agreement on what might be considered an ideal merchandising program, and there is no such agreement in sight for the future. In the main, companies which have played the dealer cooperation game are still exponents of dealer cooperation, and those who have been apostles of aggressive merchandising are only waiting for the chance to get back into business at the same old stand.

The greatest changes in the shifting merchandising pattern for gas appliances may not come from within the industry at all, but may be necessitated by the invasion of the field by new factors in both the manufacture and the distribution of household equipment. Post-war planning as it presently appears generally seems to boil down to one common denominator—every manufacturer with a war-expanded plant hopes to keep that plant busy by invading some new field after the war orders start to taper off. And if we are to believe half the rumors that come to our ears, the manufacture and sale of durable consumer goods is regarded as the Cherokee Strip in which about 90% of them expect to stake out a claim.

Two of the biggest rubber companies, each with a background of considerable experience in merchandising specialty items, are said to be planning retail chain store setups to rival those of the mail order houses. One of them we know has been interviewing gas appliance experts as a prelude to building up its merchandising organization. When the existing chain stores start to battle it out with formidable newcomers in the field, we anticipate that a good many of the old concepts of appliance merchandising will be radically and rapidly revised.

There has been built up over the years a spirit of understanding and accord between the principal manufacturers of gas appliances and the natural gas utilities. In this spirit rather than in the premature announcement of any detailed plans lies the future of the gas company manufacturer cooperation which has been the spearhead of industry expansion in the past.

Give-away Fuel

WHILE we have never been inclined to counsel an easy and trusting disregard for the plans and proposals of the competition—meaning the electric, the coal and the oil industries — we do believe that there is such a thing as worrying about what the other fellow may be doing to the detriment of our own purpose and determination.

It is seldom indeed that a speaker, discoursing on the state of affairs that will exist as we resume the cultivation of more normal markets, fails to point with alarm to whichever happens to be the chief competitive wolf in his own particular fold.

An aroused industrial gas man, speaking before the industrial gas round table conference at the National Metals Congress in Chicago, looked over the field and came up gasping for breath, voicing his conviction that "in the period following the period of adjustment after the war, competition will hit us with everything in the book." As he sees it, the electrical industry with its greatly expanded generating capacity is going to sell its cheap kilowatts "come hell or high water"; an all-out effort will be made by the LP-Gas industry to capture the industrial gas markets, and the oil industry will be in there pitching new and improved oil-burning equipment into the struggle for the industrial consumer's dollar.

Since competition has always been tough, except in those rare occasions in the history of the natural gas industry when it has been operating in a seller's market, we see no reason to anticipate that it will be anything less severe in the years of recovery that will follow the war. But we also believe that if some of the pre-war and some of the present industrial gas load were lost by the industry it would be more in the nature of a blessing than an evil. We have never seen any sense in natural gas men fighting to give their fuel away or to sell at dump load rates for uses where an inferior solid fuel would serve just as well. There certainly must be a few isolated conditions across the face of the U. S. A. where the use of coal or oil or electricity would be preferable to natural gas from an economic as well as an engineering standpoint.

The requirements of war production have pointed up a few things about our oil and gas reserves that cannot be shrugged off, and one of those things is that they are limited in their quantity and the faster they are used up the sooner we will be without them. Each operating gas company is in a position to best determine the nature and size of the industrial load that it can most economically carry. In some areas, of course, the sky is still the limit and it remains expedient to sell gas at almost any price to save it from being wasted.

But the days of the almost free and very easy dissipation of our natural resources are drawing to a close. The industrial gas sales program of every natural gas company would be well advised to take this fact into consideration. The future of natural gas as an industrial fuel lies in the highest refinement of its utilization technique, and in its promotion for and sale to those processes that can use to the utmost its many unique advantages. We propose a slightly revised inner circle slogan among industrial gas men—"Gas is a superior fuel; sell it wisely."

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A momentary glance ahead, to peacetime, reveals a future of better skills, better methods, better products.

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This is not unusual. Connelly governors are aiding Gas Companies throughout the world to meet many unusual pressure demands. They are designed and built to give years of satisfactory, economical, trouble-free service.

For more than 67 years, through wars and peace, Connelly has been supplying the Gas Industry with apparatus and gas purification materials. The vast amount of field data and experience garnered in this time is at the disposal of the industry. Take advantage of this experience . . . consult Connelly . . . there is no obligation.

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Connelly IRON SPONGE

The GAS UTILITY INDUSTRY in 1943

All War Demands Met; Customers Now 19.45 Million; Natural Gas Expands

By ERNEST R. ACKER

President, American Gas Association

DESPITE severe shortages of materials and manpower, the gas industry rates 1943 as a year of marked achievement. While essential civilian services in the home and elsewhere were maintained, facilities were expanded to increase the output of gas fuel needed by industry to meet every requirement of the war emergency without curtailment of supply.

Statistical Summary: At the end of 1943, 19,450,000 customers, the largest number ever connected to the mains of the industry, were being served with gas. This was an increase of 1.9% over the year 1942. Of this total, manufactured and mixed gas companies were serving 10,696,000 customers while 8,754,000 were served by natural gas companies.

Revenues of the entire industry, both manufactured and natural, aggregated $1,071,850,000, an increase of 7.8% over 1942. Natural gas companies grossed $633,195,000, a gain of 8.5%, whereas manufactured gas companies grossed $438,655,000, or 6.8% more than for 1942.

Industrial sales of natural gas registered an increase of 113,558,000,000 cu. ft. during the year, bringing total sales for 1943 to 1,019,617,000,000 cu. ft. This was a percentage increase of 12.5. Sales of manufactured gas for industrial purposes were 116,968,000,000, or 24.1% greater than for the previous year.

In the household uses of gas, such as cooking, refrigeration, house heating, water heating, etc., manufactured gas companies sold 303,682,000,000, a gain of 7.1%. Gas consumed for house heating registered an increase of 12.2%. Sales of natural gas for domestic uses registered an increase of 6.1%, or 505,488,000,000 cu. ft.

Indications are that the total production of natural gas in 1943, including amounts used in the manufacture of carbon black and for field purposes, will reach approximately three and one quarter trillion cu. ft. During the year, 294,683,000,000 cu. ft. of natural gas were used as fuel for generating electric power. This was an increase of 61,916,000,000 cu. ft., or 26.6% over the preceding year.

Gas Fuel Conservation: In addition to the question of basic supply, the gas industry has shown an outstanding ability to adjust its operations, personnel and economics to war conditions. It has accepted necessary governmental limitations and restrictions in good faith and has carried its full share for the responsibility of the conservation of critical resources.

The national seven-point conservation program represents at this time one of the most vital and far-reaching factors in the industry's relationship to the conduct of the war. The initiation of this new program finds the gas industry fully qualified by experience and past performance to give effective support to it.

The oil conservation program undertaken by the industry last winter and during the spring of this year made a substantial contribution to the oil situation and was recognized by governmental agencies as an outstanding industry accomplishment. The approval of the industry's conservation efforts was largely responsible for the avoidance of more drastic alternatives such as the proposed substitution of gasoline for light and heavy oils in water gas production.

ERNEST R. ACKER

Research Laboratories Busy: "More of everything" summarizes the activities of the Testing and Research Laboratories of the American Gas Association during 1943, by far the busiest year in its history, with emphasis placed upon its work in the war field.

Conduct of war work and increased research assignments made it necessary to augment the laboratories' staff by 125%. Some 14 separate and distinct devices of vital importance to the war effort were developed directly for various branches of the war department, several of which are in production and others in the test period.

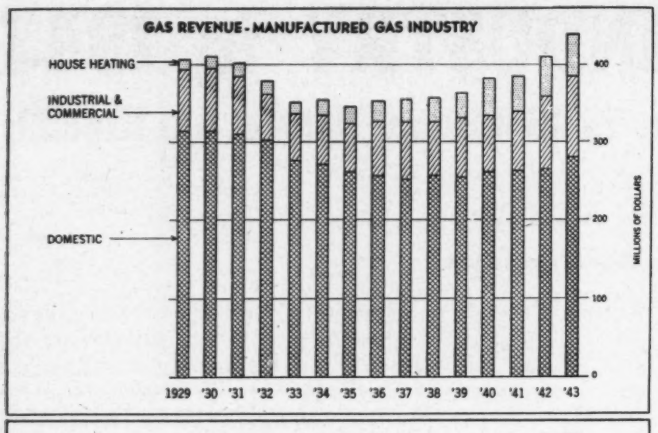
While most of these devices are of a highly confidential nature, it can be revealed that the laboratories are providing 25,000 automatic oxygen regulators as a safeguard for our flying fighters at high altitudes and an oxygen therapeutic set for the air transport of sick and wounded personnel. Early large-scale production is anticipated on several additional regulating devices developed and supplied for experimental purposes. All these devices are related to the indication, regulation or detection of gas.

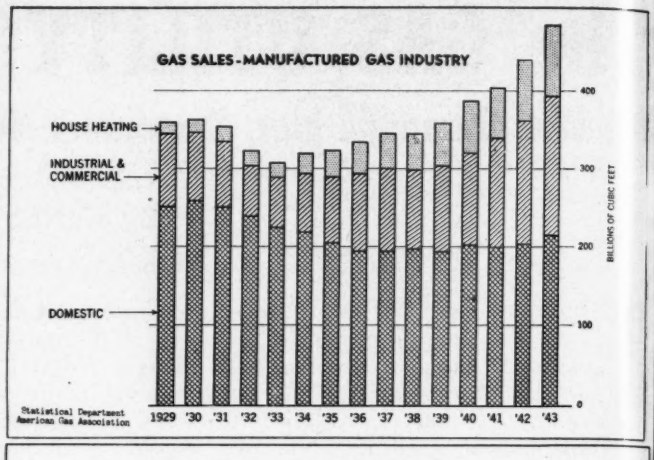
Until the war is won, the greater part of the operations of the laboratories will undoubtedly continue to be devoted to direct war work. More war work is expected, involving equipment developed by the laboratory staffs.

In addition, the laboratories are engaged in the most extensive research activities in their history, the program of domestic gas research having been accelerated by 400% in 1943. This is intended to aid in the development and improvement of equipment to be manufactured in the post-war period in order that the public will be supplied with new types of appliances incorporating the latest features of design and the most effective means of fuel utilization.

For example, such features as complete automatic ignition of all burners, faster radiant broiling, cooler exterior oven surfaces, better visibility in ovens, smaller, lighter and more efficient burners are all well within reach and similar improvements are projected for other gas equipment.

Expansion of the educational, re-


GAS REVENUE - MANUFACTURED GAS INDUSTRY
HOUSE HEATING
INDUSTRIAL & COMMERCIAL
DOMESTIC
MILLIONS OF DOLLARS
1929 '30 '31 '32 '33 '34 '35 '36 '37 '38 '39 '40 '41 '42 '43


GAS SALES - MANUFACTURED GAS INDUSTRY
HOUSE HEATING
INDUSTRIAL & COMMERCIAL
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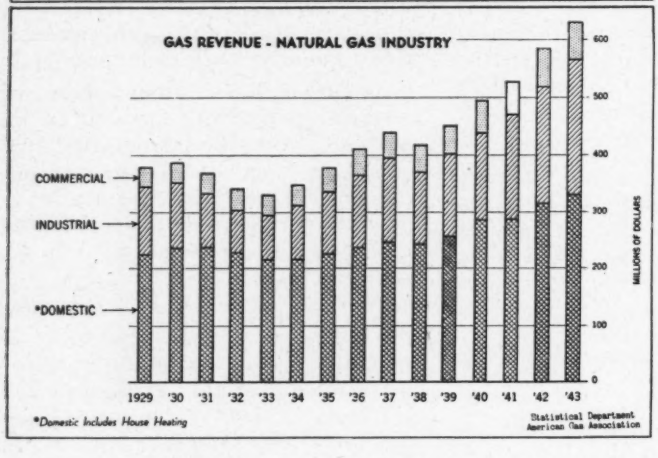
GAS REVENUE - NATURAL GAS INDUSTRY
COMMERCIAL
INDUSTRIAL
*DOMESTIC
MILLIONS OF DOLLARS
*Domestic Includes House Heating
Statistical Department American Gas Association
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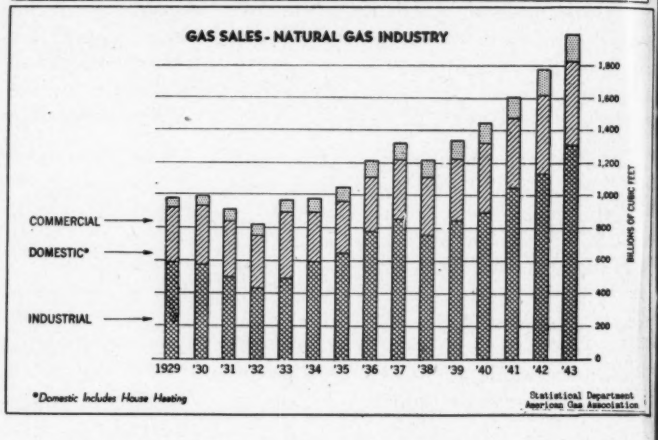
GAS SALES - NATURAL GAS INDUSTRY
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Statistical Department American Gas Association
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search and library services of the Institute of Gas Technology at Illinois Institute of Technology, brought the annual budget to approximately $200,000. After two years of existence, the Gas Institute now has a fellowship group of 21 post-graduate students training for specialized technical service in the gas industry. There are in addition a number of research projects under way for various gas utility companies as well as several long-range fundamental research programs established for the general benefit of the gas industry at large.

Natural Gas Expands: Evidencing a solid front in support of the war program, this branch of the industry has demonstrated that it is sufficiently flexible to meet requirements of a growing market despite a multiplicity of shortages in men and materials.

The essential needs of 8,750,000 homes and business establishments were met, together with a substantial portion of the gas fuel requirements of almost 2,000,000 additional customers who use mixed gas. An ever-increasing quantity of natural gas was furnished for use in war manufacturing processes—up to perhaps 70% of the total volume of natural gas delivered during the year to customers, exclusive of field use.

Many pipe line companies selling gas to large volume consumers on an interruptible basis increased their annual output without the use of new critical materials in any substantial quantity.

During the year the need of additional transmission facilities resulted in Washington approval of the construction of several important lines. These include 120 miles of 20-in. line of the East Ohio Gas Co. which will supplement with 50,000,000 cu. ft. a day the supply available to the congested centers of the Cleveland area and the Cities Service Transportation and Chemical Co. line of 231 miles of 26-in. pipe which will increase supplies in Kansas and Missouri.

In addition, authorization has been given to the Tennessee Gas & Transmission Company to build 1200 miles of line from Driscoll, Tex., to West Virginia. This increase in supply will be of tremendous advantage to the Appalachian area whose local supplies have been strained because of the unprecedented demand in that region by war industries and by domestic customers having a priority status.

Wartime evolution of the use of natural gas hydrocarbons in industries that are clearly separate and apart from the production, transmission and distribution of natural gas for fuel uses, holds out great promise for the future.

Skilled research chemists have shown that it is possible to rearrange the molecular structure of natural gas hydrocarbons in a multitude of new ways and bring forth dozens of end products that include a variety of solvents, plastics, explosives, synthetic rubber and aviation gasoline.

During the year notable advance has been made in the integration of natural gas facilities, the development of underground storage and the liquefaction of natural gas to provide increased storage in a minimum of space against winter peaks.

Industrial Gas: Although the war production program launched the greatest industrial heating revolution ever experienced, the peak of factory expansion and new factory construction required by the gas industry was passed in 1943, and the program nears completion. Unprecedented quantities of modern, efficient, industrial gas equipment were installed during this period, and older gas equipment was revamped in order to turn out new war products. Upon these industrial gas furnaces, ovens and other apparatus depends the superior quality of the vitally important parts of practically every implement of war fabricated in the United States.

The industrial gas loads that keep these war furnaces running day and

night are the largest ever provided by the gas industry and, together with still further modernized and improved industrial gas equipment, will be the foundation for large and important industrial gas loads after the war.

Probably the most significant progress of the year was made in radiant gas heating and its application to baking, curing and drying operations. The brightest future in processing appears to be opening up to methods which permit more rapid heat transfer, reduction in space for equipment, more precision in control, and a reduction in capital investment in equipment—promising ever-widening usefulness for radiant gas burners. This gives gas a lead position in the realm of chemistry and plastics; there are great possibilities in the food dehydration industry, in textiles, in steel, ceramics and in china. Today, radiant gas-fired, heat-treating furnaces and china-firing kilns are being operated at temperatures of 2400 degrees F.

The gas used for radiant combustion may be in any of the commercial forms—natural, manufactured, mixed or liquefied petroleum gases, but the burners must be designed both for the particular type of gas as well as for the particular application.

Illustrative of the flexibility of gas fuel is the unique application of natural gas in the production of magnesium, because of the opposite role it plays; it is used in the carbothermic processes as a shock chilling agent, bringing the temperature down to 395° F., and it is used in the ferrosilicon processes to produce furnace temperatures of 2000° F. upwards.

Several large plants in this country are utilizing these processes to produce the huge quantities of magnesium needed in airplane construction and in production of ordnance supplies.

Commercial Field: Immense quantities of new gas equipment were installed in 1943 for the purpose of feeding the army, navy and the marines in their training period and in most of the permanent stations and bases at home. In addition, the great increase in meals eaten by war workers was, in most cases, taken care of with gas equipment.

Also, the upsurge in general civilian "eating out"—superinduced by the high points required for rationed meats and canned foods, taxed the capacity and durability of the gas equipment installed in hotels, restaurants, lunchrooms, night clubs and other eating places.

Home Service Contributes: Home service, the branch of the gas industry which represents the largest group of graduate home economists in a single industry in the world, is credited with making the year's major contribution of the industry to community life and national welfare under wartime conditions.

Complete cooperation and aid was given the governmental programs of nutrition in the home and in industry, conservation of foods, fuels and appliances, and the establishment of information bureaus to interpret and "sell" food rationing to the public. To this end, 12 million customer contacts were made by home service personnel within the year as a means of stimulating consumer acceptance of the government's requisite wartime programs on the home front.

Post-War Plans: Since it is granted generally that the transition from war to peace will be a difficult and complex period, plans are being made for the reconversion of the gas industry to a sound peacetime economy with the cessation of war, in order to reduce dislocations to a minimum, stabilize the industry through the period and have tested and approved household appliances ready for production as soon as factories can be reconverted.

Factors being appraised include character, scope and methods of expanding markets, changes in purchasing power, development of new appliances and preparation for the resumption of sales activities.

The industry believes there are many fundamentals as to why it can best serve the domestic market; the quality of service rendered to the customer; the conservation of national resources; employment of labor, basic economies to the customer and to the company.

In appliances, the industry has ceased to think in terms of ranges, water heaters and house heating equipment as separate units, but rather of the combined service where each appliance becomes a sustainer of the other and the benefits of added loads may reduce the cost to the customer. This fact makes house heating assume new importance, especially since one of the most promising of new services which will be available is year-round air conditioning. This has passed the field test, awaits the go signal for production, and is expected to provide a substantial addition to the industry's off-peak load.

An effort was made during the year to seek to reduce to a minimum the number of domestic gas appliance models required, as well as individual company requirements, to the end that the equipment suppliers might reduce to a minimum their costs of manufacture, and thus be able to provide high quality equipment to insure maximum customer satisfaction and yet retain minimum cost.

Among other plans, there is in process of evolution a coordinated kitchen equipment plan which the gas industry can offer the public as a complete package kitchen, including cupboards, sink, range, refrigerator, dishwasher, water heater, etc. This can be purchased piecemeal or all at one time, and the plan already has the support of some large kitchen equipment manufacturers and some important national sales outlets.

PRELIMINARY ESTIMATES ON THE GAS INDUSTRY FOR 1943

	1943	*1942*	*Per Cent Change*
CUSTOMERS			
Domestic (incl. house heating)	18,375,000	18,011,000	+ 2.0
Commercial	979,000	979,000	0.0
Industrial	96,000	95,000	+ 1.1
Total	19,450,000	19,085,000	+ 1.9
GAS SALES (Mcf.)			
Domestic (incl. house heating)	809,170,000	760,029,000	+ 6.5
Commercial	220,785,000	211,596,000	+ 4.3
Industrial	1,435,304,000	1,236,566,000	+16.1
Total	2,465,259,000	2,208,191,000	+11.6
REVENUE (Dollars)			
Domestic (incl. house heating)	667,597,000	$633,445,000	+ 5.4
Commercial	116,281,000	114,958,000	+ 1.2
Industrial	287,972,000	245,913,000	+17.1
Total	$1,071,850,000	$994,316,000	+ 7.8

Statistical Department, American Gas Association.

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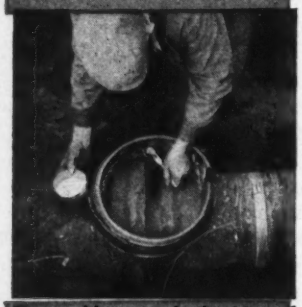
IMPORTANCE RECOGNIZED BY GOVERNMENT!

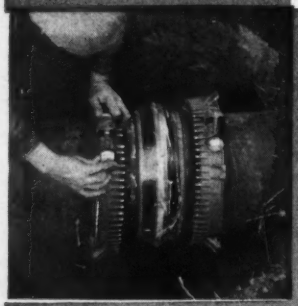
Maintenance of uninterrupted service is just as important as the manufacture of munitions. Recognizing this, the government has allowed us enough material so that we can, in most cases, make immediate shipment under good ratings.

Clean pipe thoroughly—then center brass band over break, bending tab back to lock.



Thoroughly soap both sides of gasket and pipe with heavy soap water.

Center gasket and Monel Band over brass band.



Assemble halves of clamp over pipe and bolt together.

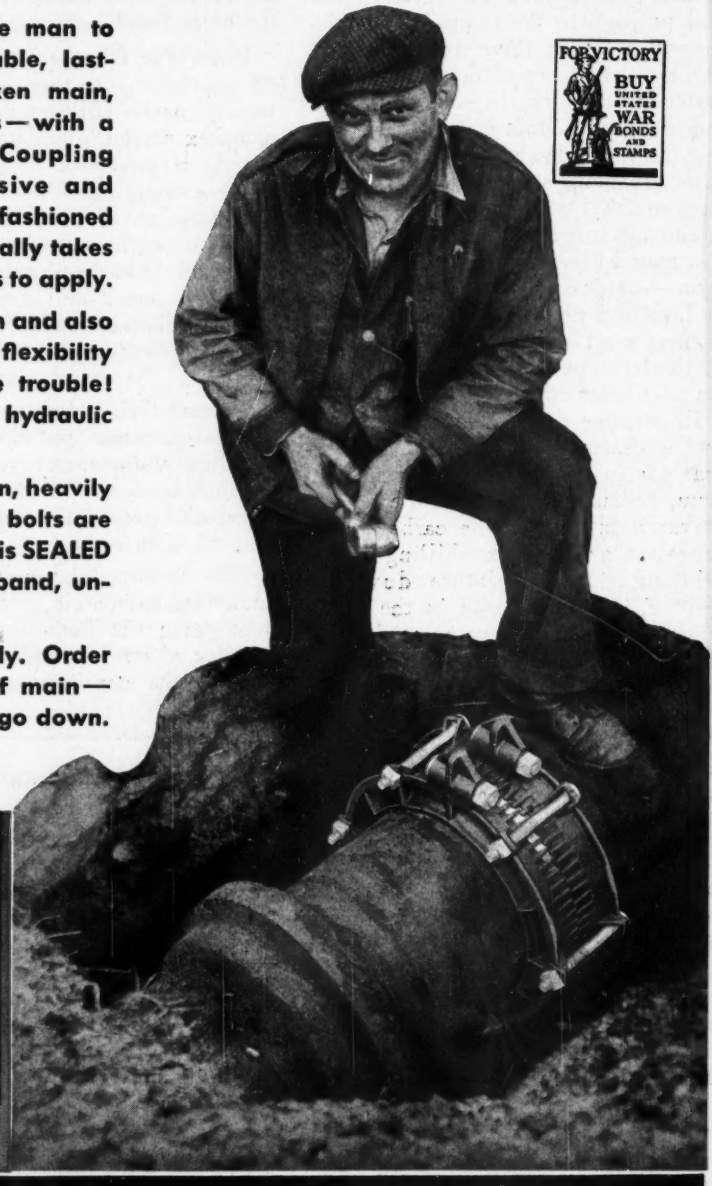
Insert pull bolts and tighten all around evenly.

● **IT'S EASY for one man to make a dependable, lasting repair of a broken main, in 15 minutes or less—with a SKINNER-SEAL Split Coupling Clamp! Less expensive and lighter than the old-fashioned split sleeve, which usually takes 2 or 3 men 3 or 4 hours to apply.**

Splices the broken main and also provides a degree of flexibility which prevents future trouble! Easily passes 600 lb hydraulic pressure test!

Made of malleable iron, heavily enameled. Sturdy steel bolts are electro-plated. Gasket is SEALED by Monel Metal Seal band, under pressure of rings.

Thousands used yearly. Order today for each size of main—watch repair expense go down.



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LIQUEFIED PETROLEUM GAS IN 1943

Domestic Market Curtailed; Production, Up 19%, Aids War Programs

By G. G. OBERFELL

Vice President in Charge of Research, Phillips Petroleum Co.

MARKETED production of liquefied petroleum gases for fuel and miscellaneous purposes is estimated to have increased 19% in 1943 over 1942 to 635,000,000 gal. This estimated increase of 102,600,000 gal. is made on a different basis than in this author's previous annual reviews.[1] Details of the estimate are shown in Table 1. Changes in the industry made it appear desirable to modify former methods of reporting marketed consumption. Heretofore estimates included LP-Gas used in chemical manufacturing only when delivered in liquid form. Deliveries in gaseous form by pipe line from oil refineries and natural gasoline plants were not reported. This year all LP-Gas used in chemical manufacturing has been eliminated from the estimates.

In 1942 the chemical manufacturing industry used 53,038,000 gal. of LP-Gas delivered in liquid form by tank truck and tank car. Chemical manufacturers also processed large volumes of gaseous hydrocarbons in the LP-Gas range delivered by pipe line from refineries and gasoline plants. In 1943 there was an unusually large increase in consumption of LP-Gas by chemical plants. Estimation of the amount used, however, is made difficult by duplications arising from inter-plant movement for partial processing. Publication of data regarding some phases of chemical utilization of LP-Gas probably would be undesirable during wartime.

In general, it may be said that rubber and aviation gasoline consumed rapidly increasing quantities of butanes and propane, particularly in the last half of 1943. Twelve butadiene plants charging butane and butylene were completed and placed in operation in 1943. Synthetic rubber output increased more than tenfold between the first and fourth quarters, from 10,486[2] tons in the first quarter to 123,300 tons in the fourth quarter. As previously stated, LP-Gas use by these plants is not included in the present estimate. Concurrent with the building of synthetic rubber plants the oil industry has been building aviation gasoline plants requiring butane and butylenes. Isomerization of normal butane for alkylation with butylenes caused the diversion of a tremendous quantity of butanes from other uses.

For several years the relative volume of propane sold for LP-Gas purposes has increased and the relative volume of butane has decreased. In 1943 this trend was accentuated. Industrial consumers used products containing a larger percentage of propane or switched from butane to propane where propane tankage was available. In a few instances 80-lb. storage was replaced by 200-lb. storage at industrial plants to permit conversion from butane to propane.

Domestic Usage: Although new domestic installations were subject to government approval, a considerable number were made in 1943. Defense housing projects accounted for many new individual consumers. Government approval was given also to conversion of gas appliances to liquefied gas when consumers moved away from gas lines. New installations were approved in areas where no other fuel was readily available.

G. G. OBERFELL

Domestic installations at the close of 1943 are estimated to total 1,900,000. This is an increase of 75,000 over last year's estimate. Part of the increase was due to correction of the previous estimate and part to new installations. About 5000 new buried tank installations were made in the south. In Oklahoma, for example, 700 new installations were inspected by the state fire marshal in the first 10 months.

LP-Gas and Utilities: Use of liquefied petroleum gases by public utilities for gas manufacturing continued to increase at the rate of about 24% per year. Gas utilities have been confronted with unprecedented demand from war industries and domestic consumers. On the Pacific coast gas utilities increased their purchases of liquefied gases 10% in addition to the 70% increase the previous year. In the Middle West one utility recently installed two diluters having an output of 5,000,000 cu. ft. of propane-air gas per day. The same company also is mixing propane with water gas for underfiring a battery of four coke ovens and is enriching water gas for general distribution. This one company proposes to use five to seven million gal. of propane in 1944.

Natural gas distributors experienced shortages during the past winter at peak load periods. Where natural gas was short, the cause, in most cases, was lack of adequate long distance pipe lines of pipe line breakage rather than actual shortage of gas. One result of last winter's gas shortage was the demand for a considerable number of propane standby installations. Two large military camps in Oklahoma now served with natural gas installed standbys in recent months. One of these plants has storage capacity for 100,000 gal. of propane and another

[1]Press release of Glass Container Institute.

[2]Progress Report No. 4, War Production Board, Office of Rubber Director.

TABLE 1. MARKETED PRODUCTION OF LIQUEFIED PETROLEUM GAS

Total Sales			Distribution—Gallons Per Year					
Year	*Gallons Per Year*	*Per Cent Increase Over Previous Year*	*Domestic*	*Per Cent Increase Over Previous Year*	*Industrial and Miscellaneous*	*Per Cent Increase Over Previous Year*	*Gas Manufacturing*	*Per Cent Increase Over Previous Year*
1922	222,641	.....						
1923	276,863	24.4						
1924	376,488	36.0	Sale of liquefied petroleum gas confined primarily to bottled gas business prior to 1928.					
1925	403,674	7.2						
1926	465,085	15.2						
1927	1,091,005	134.6						
1928	4,522,899	314.6	2,600,000	.....	400,000	.....	1,500,000	.....
1929	9,930,964	119.6	5,900,000	126.9	1,500,000	275.0	2,500,000	66.7
1930	18,017,347	81.4	11,800,000	100.0	2,200,000	46.7	4,000,000	60.0
1931	28,769,576	59.7	15,294,648	29.6	7,171,686	226.0	6,303,242	57.6
1932	34,114,767	18.6	16,244,103	6.2	8,167,194	13.9	9,703,470	53.9
1933	38,931,008	-14.1	16,625,588	2.3	13,987,095	71.3	8,318,325	-14.3
1934	56,427,000	44.9	17,681,000	6.3	32,448,000	132.0	6,298,000	-24.3
1935	76,855,000	36.2	21,380,000	20.9	47,894,000	47.6	7,581,000	20.4
1936	106,652,000	38.8	30,014,000	40.4	67,267,000	40.5	9,371,000	23.6
1937	141,400,000	32.7	40,823,000	36.0	89,402,000	32.9	11,175,000	19.3
1938	165,201,000	16.7	57,832,000	41.7	94,983,000	6.2	12,386,000	10 8
1939	223,580,000	35.3	87,530,000	51.3	120,615,000	27.0	15,435,000	24.6
1940	313,456,000	40.2	134,018,000	53.1	159,153,000	32.0	20,285,000	31.4
1941	462,852,000	47.7	220,722,000	65.0	216,875,000	35.8	25,255,000	24 4
1942	532,402,000*	27.0*	299,559,000	36.0	201,477,000*	16.7*	31,366,000	24 0
1943	635,000,000†	19.0	350,000,000	17.0	246,000,000	22.5	39,000,000	24 0

*Not including 52,904,000 gal. used for chemical manufacturing.

†Chemical manufacturing consumption not included.

Remarks: In the above table, "Total Sales" for all years except 1943 were obtained from U. S. Bureau of Mines reports. "Distribution" for the years 1931 to 1942, inclusive, was obtained from the same source. All other volumes are estimated by the writer. The total sales volume includes all liquefied petroleum gases (propane, butane, and propane-butane mixtures) when sold as such. It includes the sale of pentane when sold for any purpose other than motor fuel blending. It does not include butane when blended with heavier petroleum fractions for motor fuel purposes. Inter-company sales transactions, such as purchases of liquefied petroleum gases by one company from other companies and then resold as liquefied petroleum gases, have been eliminated in order to avoid duplication of sales figures. The data do not reflect sales of liquefied petroleum gases used directly by the producer at the point of production, for fuel, polymerization, solvent de-waxing, etc. Neither do the figures include sales of hydrocarbons to chemical plants or to plants manufacturing synthetic rubber or aviation gasoline or their components.

has 50,000 gal., 10 days' supply in each case.

When steel once more is freely available, it is expected that there will be a considerable increase in the use of propane or butane for cold carburetion. Plans are known to be afoot for conversion of a number of town gas plants from manufactured gas to butane-air or propane-air or undiluted propane after the war.

Greater diversion of butanes to aviation gasoline and rubber encouraged refiners in a number of instances to use propane as a gasoline blending agent to obtain sufficient volatility. Experiments have shown that up to about 3% propane may be blended with motor gasoline to give good starting characteristics where butane supplies are deficient.

Industrial Usage: Industrial consumption of LP-Gas suffered a brief slump early in 1943. The upward curve of demand was resumed after a short delay as activity increased, particularly at aircraft sub-assembly and parts plants and shipyards.

The shipbuilding industry is an outstanding example of the use of liquefied gases to speed war work. It has been said by shipbuilders that propane has done more than any other product to speed the fabrication of ships. Propane has been used to augment and in many places to supplant acetylene for metal cutting operations. With oxy-propane torches cutting speed has been increased materially. The kerf is much smoother and thus does not require a grinding operation. The amount of slag to be removed is negligible. As an example of how this type of use has increased LP-Gas demand, shipyards supplied by one company increased their propane consumption 53% in 1943 over 1942, which was, in turn, 170% greater than 1941.

In other operations replacement of fuel oil with liquefied gases has speeded preheating of plates and pipe for bending. With propane it is possible to keep work clean by eliminating carbon deposit and localizing heat. This is particularly true in Van Stoning operations. Other applications where propane has helped improve working conditions and reduce heating time include core baking, lead melting, forging small parts, submerged combustion in pickling baths, rivet heating, rivet washing, die casting operations, and many types of heat treating.

Many of the increases in demand on the liquefied gas industry this past year were caused by the war but are not, strictly speaking, solely war demand. The glass industry is an example. The shortage of tin plate has diverted a great deal of packaging of food from metal to glass. In 1943 the glass industry manufactured about 13.4 billion containers compared with 11.5 billion in 1942 and 8 billion in 1941. The glass industry is manufacturing millions of bottles for direct war consumption such as blood plasma containers, medicine bottles, etc.

Eight typical glass manufacturing companies had a prewar annual consumption of 770,000 gal. of liquefied petroleum gases. For the past two years these eight companies have consumed 2,975,000 gal. per year. The companies in question were not converted from other fuels to liquefied gases; so the increase largely reflects the expanded production.

Transportation Problem: Transportation has been a major problem of the industry in 1943. Additions to the fleet of pressure cars included 431 new propane cars, 110 new butane cars and 183 natural gasoline cars modified to permit transportation of butane. Many of these new and modified cars were not delivered until late in the year. The industry could have supplied additional quantities to utilities and other industries had it not been necessary also to provide transportation for large volumes of butane,

Photograph—Courtesy Latchford-Marble Glass Company

HELPS SPEED PACKAGING VICTORIES IN THE BATTLE OF THE BOTTLENECKS

The glass industry is another vital cog in the American production machine. Glass units, whether bottles or jars, are waging an endless and victorious battle to alleviate the packaging shortages in many new and vitally important fields. Their theatres of operation are varied, industrial—commercial—military.

The three points that determine the perfection of these units are quality, clarity and durability. And all three depend on proper regulation of gas for successful results. Controlled temperatures of furnaces and precision annealing lehrs depend on a uniform and regulated flow of gas. With Reliance Regulators, fluctuating inlet pressures are leveled off to correct and uniform pressure for all burners in every operation. Thus Reliance Regulators help Speed Packaging Victories in the Battle of the Bottlenecks. To go a bit further, there is a Reliance Regulator of the proper type and size for every gas control problem. Investigate the possibilities of putting Reliance Regulators to work for you.

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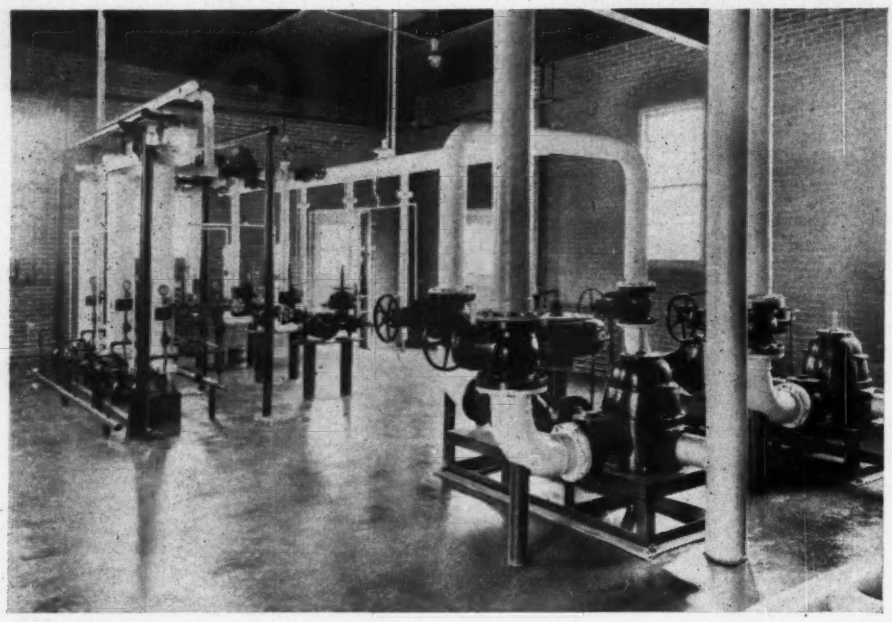


Interior of vaporizer house at an eastern steel plant. Propane from a battery of six 30,000-gal. storage tanks is vaporized and diluted with air to predetermined heating values in this equipment, allowing for direct substitution for natural gas. Compressors, not shown in the photograph, deliver the gas to heat-treating furnaces at high pressure.

butylenes and isobutane for the aviation gasoline program.

As the year progressed it was necessary to move ever increasing amounts of isobutane from natural gasoline plants to oil refineries for alkylation. Normal butane movement to isomerization plants also required pressure cars. The situation was complicated further by the lack of balance within the refining industry on the production of so-called B-B (butane-butylene) cuts. It was not possible to match butylene production with alkylation capacity at every point. One result was the necessity to ship butane-butylene mixtures from one refinery to another.

Two government directives designed to aid the war imposed an additional burden on the liquefied petroleum gas industry in the last quarter. Directive 75 requiring all butanes containing as much as 20% isobutane to be shipped to fractionating plants for separation of isomers reduced the total supply of butane available for conventional purposes and put an added strain on transportation facilities. The necessity for greater inter-refinery movement of B-B cuts caused the government to request all owners or operators of pressure cars to put 5% of their fleets into this refinery service. Most owners already were devoting large numbers of their cars to aviation service. By a super-human effort the industry kept most customers from running completely out, although shipments in some cases were delayed.

Trucking operations of the industry have been increased both for transfer of B-B cuts between refineries and for deliveries of LP-Gas to war plants and domestic consumers. Many manufacturers who formerly used tank cars are delivering 40% to 60% of their product by tank truck. Truck delivery operations have been complicated by the manpower shortage, gasoline and tire rationing and delays in obtaining repair parts.

In May, 1943, the interstate commerce commission, in deciding the issue in ICC Docket 28663, Green's Fuel, Inc., vs. Atlanta & Saint Andrews Bay Railway Co., et al, found the estimated weight of 6.6 lb. per gal. on liquefied petroleum gas from the Southwest to the Southeast unreasonable to the extent that such estimated weight exceeded 4.7 lb. per gal. Rail carriers filed tariffs to become effective on Nov. 30, 1943, reflecting an increase of 40% in rates subject to an estimated weight of 4.7 lb. per gal. which would have resulted in substantially the same per-car charges as had prevailed by the use of estimated weight of 6.6 lb. per gal.

The commission, in I. & S. Docket 5271, suspended the increased rates but the estimated weight of 4.7 lb. per gal. has been permitted to become effective. Therefore, effective Nov. 30, 1943, the per-gallon charge will be approximately one-third less than prevailed prior to that date on shipments from southwestern origin points to the Southeast, embracing substantially destination territory east of the Mississippi river and south of the Ohio river.

Manpower a Critical Problem: The manpower situation in the LP-Gas industry, as well as in all other industries considered essential to the war effort, has been critical. The war manpower commission has recognized the industry as being essential, resulting in some technical and key employees being granted occupational deferments for limited periods of time. However, the loss of men to the military services has been large, and the ingenuity of management has been taxed to the limit in not only maintaining necessary services but increasing many of them where required in order to assist in prosecuting the war.

To cooperate with the government in the complete utilization of all available manpower, the industry has ceased all retail sales activities for the duration of the war. Service work has been reduced to a minimum. Management has taken extreme care, by thorough planning and giving close attention to details, to effect consumer deliveries in such a manner that manpower as well as tires and motor fuels can be saved and the necessity for vehicle repairs reduced to an absolute minimum. Women are being used extensively in jobs normally held by men. In some instances both office and field labor, as well as supplies and equipment, have been saved by billing retail domestic accounts every two months instead of the more frequent peacetime intervals.

Results of the various plans and methods adopted to save manpower have been surprisingly effective. The number of employees required by one company to carry on operations has been reduced 44% in 1943 when compared to 1941. Average gallons of liquefied petroleum gas delivered per employee in 1943 increased 123% over delivery per employee in 1941.

At the close of the year 1943, the industry is in the position of further "tightening its belt" in the face of greater demands by the war manpower commission for men for the armed services. A continuation of job studies, proper placement and utilization of the highest skills of available men and women, in conjunction with intelligent and conscientious leadership, should make it possible for the industry not only to maintain its position but to make further advances under what might be termed adverse circumstances.

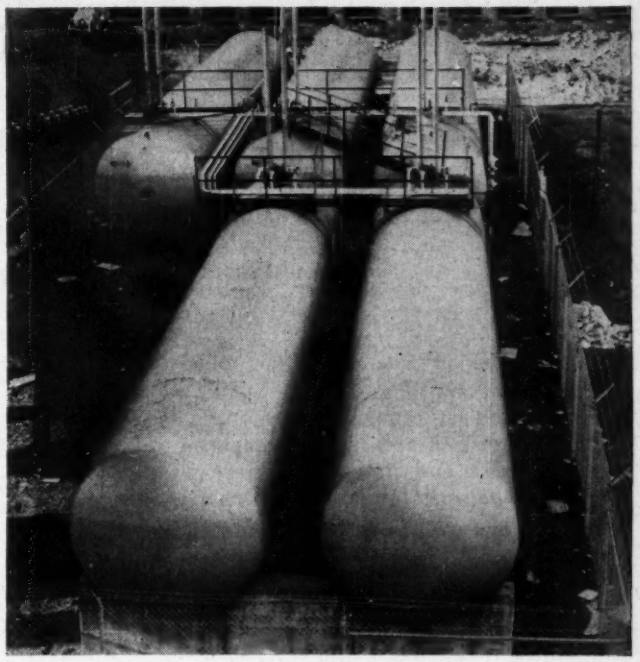
Increases in Supply: Ten new natural gasoline plants begun since the war were put into operation in 1943 to increase materially the available supply of liquefied petroleum gases. Production was increased also by substantial additions to previously

existing plants. Butane fractionating columns were installed where possible to increase the supply of isobutane for aviation gasoline manufacture. Refrigeration was added at some plants to improve efficiency of extraction.

Texas and Illinois added more new production of liquefied gases than any other state. Illinois production rose about 50,000,000 gal. Three large recycle plants in Texas added materially to motor fuel supplies as well as to production of isobutane, normal butane and propane. Two plants were built in Arkansas for the primary purpose of sulfur removal from sour natural gas to be used as fuel for war plants. Both plants are producing large quantities of liquefied gases as by-products.

To aid the war program one Texas manufacturer tied a group of old gasoline plants together by pipe line into a central treater where isobutane was recovered in addition to normal butane and propane. Previously mixtures had been produced at some of the small plants in the system, but the project largely increased the production of LP-Gas for fuel as well as for aviation gasoline synthesis.

Another manufacturer increased production of LP-Gas with a minimum utilization of steel by passing natural gas through absorbers in the field and circulating the rich oil to a gasoline plant several miles away where still and fractionation capacity was available for recovering the LP-Gas and natural gasoline. At the year's end an Illinois manufacturer was producing raw gasoline at a simplified plant using minimum quantities of steel and transporting the raw product to an older natural gasoline plant for fractionation.



Propane storage tanks at a glass plant. Manufacturers of optical and other special glass for war instruments have found propane a superior fuel because of its purity and uniformity which eliminates bloom.

Oil refiners have increased recoveries of LP-Gas at many points although little of this increase in production is finding its way into normal LP-Gas markets. Virtually all is being used in the manufacture of aviation gasoline or synthetic rubber. A recent report of the U. S. Bureau of Mines stated that use of liquefied refinery gases for fuel purposes decreased 30% in the first nine months of 1943.

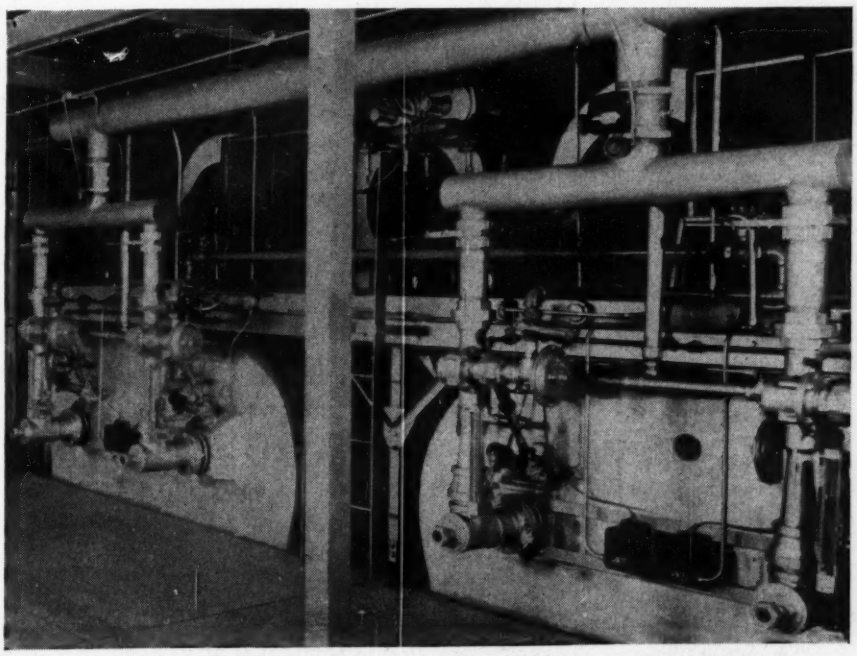
East coast refiners have made more propane this year than last, since their crude supplies have increased through operations of the "big inch" pipe line and larger crude imports by tanker. Butanes manufactured by eastern refiners are being used almost exclusively for motor fuel or aviation gasoline.

Industry advisory committees were established in the five PAW districts by Administrator Harold L. Ickes to advise the petroleum administration for war on various problems affecting the production, transportation and distribution of liquefied petroleum gases.

The Liquefied Petroleum Gas Association has continued to play an active role in the industry. Transportation and technical committees were particularly busy. The Technical and Standards Committee proposed revisions in National Board of Fire Underwriters' Pamphlet 58 to provide rules for warehousing LP-Gas cylinders and to clarify previous regulations.

State regulations and taxation measures affecting the industry were considered by legislatures in Kansas, New Mexico, Nebraska, New York, Minnesota, Wisconsin, Massachusetts, Arkansas, Georgia, Colorado, Texas and the District of Columbia. Action was taken affecting distribution in Arkansas, Georgia, Colorado, District of Columbia and Texas.

Considering wartime conditions the liquefied petroleum gas industry has served its domestic customers and war industries well. The year 1944 is expected to be a critical one, with serious problems of manpower, transportation and supply to be solved.



Burner unit and control panels of LP-Gas furnace in Midwest enameling plant.

SOME THOUGHTS ON POST-WAR PLANNING

Study Local Conditions, Help the Manufacturer: Draft Future Sales Policies

By CHARLES R. BELLAMY

Vice President, Columbia Engineering Corp., New York, N. Y.

THE question of whether or not industry at this time should make plans for the post-war period is one of general interest. A great many leaders in government and in industry have given encouragement to such planning, with the result that the American Gas Association, the National Association of Manufacturers, and other trade organizations, as well as numerous companies, have set up post-war planning committees. There are, however, in our industry, just as in others, a few leaders who take the position that planning of this nature is mainly lost motion and that 100% of our effort should be devoted toward winning the war in the shortest time possible.

While everyone agrees that the war effort is our first and greatest consideration, the majority of business leaders appear to think that some study should be given now to the social and economic changes that are resulting from the war and plans made to meet anticipated post-war conditions. It is the belief of these leaders that constructive work can be done along this line, without in any way interfering with the war effort, which will have a stabilizing effect when the transition is made from a war-time economy to a peace-time economy.

The General Electric Co., in its last annual report, has the following to say about its post-war planning committee:

> This committee has carried on and will continue such long-range planning activities, but only to the extent that they do not interfere with the full discharge of your company's responsibility in the present emergency.

This statement, it is believed, expresses the thinking of most business leaders.

It is generally expected that both private industry and the government will make a sincere effort to control post-war business conditions to the extent that there shall be neither a depression nor wild inflation. The possibility of doing this successfully is the subject of a great deal of discussion, and any conclusion reached at this time is, of course, largely a matter of opinion. The Brookings Institution study entitled "Collapse or Boom at the End of the War" lists the various factors in Table 1.

The Outlook for Gas: Some of the specific post-war problems that confront the gas industry are listed in Table 2. This incomplete list is sufficiently long to show that there are plenty of problems worthy of our attention, and it also indicates that there may be great opportunities ahead for the gas industry.

No one, of course, knows exactly what even the immediate post-war period will be like, but we are pretty sure that certain big problems will have to be met. Through study of these problems by both government and business this country should be prepared to make the transition from war-time economy to peace-time economy in an orderly manner and with minimum inconvenience to the general public. As a part of private industry it is our duty, therefore, to cooperate with other industries and the government along these lines. Our problem today, therefore, is: What plans should be made now in the interest of our own individual business?

Such questions as gas supply, pipeline extensions and changes are with us today as always and, as usual, are receiving careful attention. We have always had to plan for such things; undoubtedly always will. Today, however, we are doing a tremendous volume of temporary business on the basis of war requirements. When peace comes, as we hope it will soon, we will have to change many of our ways of doing business. We will have to return to some of the old methods, and if we are to grow and prosper will have to adopt some new methods and policies in accordance with changed conditions. It is this type of problems that should be dealt with under post-war planning.

It seems to me there are three major questions for us to answer, as follows:

1. What will be the spending power of the general public in the post-war period and how will it be distributed?

2. What will we as an industry have to offer the public in the way of attractive appliances and services?

3. How will we offer these appliances and services to the public?

This latter question concerns itself with merchandising methods, sales organization, dealer organization, advertising, etc.

America of the Future: An excellent study of post-war conditions was recently presented at the University Club, New York City, by Sumner H. Slichter of Harvard University. His findings can be summarized about as follows: When the war is over the expenditures of the government will drop from about 100 billion dollars to about 20 or 25 billion dollars per year. Large as this shrinkage in government spending will be, it is believed that the shift to peace-time production can be accomplished without any great business collapse. The main reason given for this opinion is that the plant conversion problem is much less serious than has been generally supposed, and it is pointed out that difficult conversion problems will be confined to industries responsible for less than 10% of commodity production.

According to Mr. Slichter, the backlog of deferred demand and shortage will be large—10 billion or more by mid-summer of this year, and 25 billion or more by mid-summer of 1944.

Surplus liquid assets, he says, will

TABLE 1. COLLAPSE OR BOOM AT WAR'S END

Favorable Factors	Unfavorable Factors
1. Retarded demobilization.	1. The unemployment problem.
2. Foreign reconstruction requirements.	2. Shortage of working capital.
3. Housing deficiencies.	3. Problem of reconverting.
4. Shortage of consumer goods.	4. High taxes.
5. Deferred maintenance	5. Unfavorable cost-price ratio.
6. Accumulated consumer credit.	

be far larger than ever before in our history. During 1942, for example, gross savings by individuals amounted to 30.6 billion dollars, of which 23 billion dollars were in highly liquid form, such as cash, demand deposits, time deposits, war savings bonds, etc. In 1941, and even in 1940, there were large increases in liquid savings. All in all, during the last three years individuals, apart from corporations, have accumulated more than 30 billion dollars of savings in highly liquid form, savings which they intend to turn into goods within the next several years. Part of these savings will be used to pay taxes in 1943, but it is safe to say that at the end of 1943 the surplus savings of individuals will be larger than ever before—close to 50 billion dollars, and possibly more. Never in the country's history has there been a reserve against unemployment even remotely approaching this in magnitude. This huge volume of surplus savings, Mr. Slichter believes, is a great protection against post-war deflation; but he warns that it obviously does create great dangers of an uncontrolled post-war boom.

By 1945 or 1946, Mr. Slichter says, our gross national production may approximate 155 billion dollars. Such a production figure in constant dollars would be about 50% above 1940 but would represent only a normal increase over 1929 production. With annual expenditures of around 155 billion dollars, this authority figures that the demand for automobiles will be somewhere between 4 and 5 million per year and that the demands for housing will be enormous. The increase of families alone should provide a demand for millions of additional homes by 1945. But, far more important will be the effect of higher incomes upon the quality of housing demands. Residential construction at the rate of 6 billion dollars per year for several years is Mr. Slichter's estimate. It is worth noting that this figure checks very well with the estimate made by the AGA Post-War Planning Committee, that the number of new homes to be built in the post-war period will be approximately 1,000,000 per year for a 10-year period. So much for Mr. Slichter's findings.

There are, of course, many intangible factors connected with post-war planning, but it does seem to me that if industry (capital and labor) and government cooperate in any sensible way, this country should begin a new period of growth and prosperity shortly after the war ends. There should be great purchasing power, much better distribution than ever before, and all this should be very favorable to the gas industry. Many customers who heretofore could afford gas service for only one or two purposes will undoubtedly be in position to improve their living standards and be excellent prospects for new business. It is altogether possible that after the war the demands for gas will grow faster than they have in many years, and that our various operating companies' estimates as to their future requirements will have to be revised upward. As I see it, the possibilities of our business and for the gas business in general depend upon two things: first, general business conditions; second, the quality of our service and the soundness of our sales policy.

TABLE 2. POST-WAR PROBLEMS OF THE GAS INDUSTRY

1. Source and adequacy of gas supply.
2. The re-employment and training of former employees now in service.
3. The effect of increased income levels upon gas consumption.
4. Replacement market for present appliances.
5. New home market.
6. Home heating market created by war-time fuel shortages.
7. Method of serving new developments economically.
8. Piping for factory-built homes.
9. Possibilities of standardization of appliance parts.
10. The design of appliances with greater customer appeal.
11. The kitchen of the future and the need of coordinating the efforts of manufacturers of different appliances.
12. Appliance marketing policy. Utility marketing versus dealer marketing. Particularly important to manufacturers of appliances in determining their policies.
13. Possibilities of summer air conditioning. One large utility company in the East is devoting most of its planning effort to this development.
14. New possibilities for industrial gas, radiant burner, high speed metal treating, etc.

Gas vs. Electricity: Most everyone is agreed that the gas industry as a whole can expect the most aggressive competition from the electric industry for the cooking load. This competition is almost certain to start as soon as hostilities cease, for the large electric manufacturing companies are ready now, and many electric utilities are making plans along this line. In my opinion, this approaching struggle for business will be a most important one to the gas industry, for—make no mistake about it!—**the cooking load is not only the base load but it is the bread-and-butter business of the gas industry. It is not only important by itself but it is the key to two other important services, namely, refrigeration and water heating.**

All authorities appear to agree that a tremendous potential market for modern kitchen ranges will be opened up in the post-war period, a market based upon probably 1,000,000 new homes per year and anywhere from 500,000 to 1,000,000 obsolete or worn-out units per year. The new potential market for refrigeration and water heaters should be of like magnitude. These combined markets constitute big business which should belong largely to the gas industry. Surely it is business worth planning for, especially when we know that competing fuels are surveying it with envious eyes.

It is well for us, I think, to face some plain facts in connection with the anticipated competition between gas and electricity for the cooking load. The salient facts in this struggle, I believe, are as follows:

1. Gas is a far more economical fuel for cooking than electricity. This is a very desirable feature but not necessarily a decisive advantage.

2. The gas range, properly installed, is a better cooking machine than an electric range, according to unbiased authorities. This is a very important advantage but one that unfortunately has not been appreciated by the American housewife.

3. Electric cookery has been considered cleaner and cooler than gas cookery. This is an advantage that electricity has enjoyed but one that does not necessarily belong to electricity. Careful tests indicate that a gas range (when properly installed, with provision for disposing of the products of combustion and vapors) can provide a cleaner, cooler kitchen than the present electric range.

4. The electric range has been offered in connection with an efficiently designed and strikingly attractive all-electric kitchen. This is a feature that has great selling appeal and is probably more important than any of the other features so far named. To offset this advantage the gas industry needs to offer as attractive and as efficient an all-gas kitchen or combination kitchen, including refrigeration, range, dishwasher, kitchen cabinet, etc., as the electric industry. In other words, the gas industry must offer just as attractive a kitchen layout of standardized and coordinated units as that offered by the all-electric kitchen. Since the gas industry has no one manufacturer making all of this equipment, there is immediate need of coordinated activity on the part of several manufacturers. This I believe to be one of the most urgent problems now facing the gas industry.

House Heating Will Be in Demand: Now, just a word or two about house heating. Personally, I think that the demand for house heating gas after the war will be extremely large. My reasons for this opinion are: (1) more people should be able to afford gas; (2) enormous residential construction of better type homes; (3) uncertainty about oil supply; (4) increased cost of coal. Gas is recognized everywhere as the most convenient and best fuel for house heating. Certainly, if there is prosperity in this country, more and more people will want to heat their homes with gas. In this connection the possibilities of year-around air conditioning should not be overlooked.

From all that has been said so far, it is quite evident that I am very optimistic about the market possibilities of gas. The possibilities for growth are a challenge to the gas industry, but its actual growth will depend upon how well the industry meets that challenge. In order to take advantage of possible opportunities there is much work that has to be done without delay, and there is need of real teamwork on the part of utilities and manufacturers.

What the Gas Utility Can Do Now: This all leads up to the big question regarding what definite steps can the individual utility take at this time to prepare for the post-war period. Here are two suggestions:

I. Appoint an Executive Post-War Planning Committee, the personnel of this committee to be made up of the major executives of the company. This committee to be charged with the following duties:

(a) To direct the utility's cooperation with the American Gas Association and other national industrial and governmental associations and to see that working sub-committees cooperate with local industries and the various civic and state organizations.

(b) To formulate and establish an after-the-war employment policy.

(c) To cooperate with the manufacturers of gas equipment and encourage them to perfect and standardize their products and at the same time coordinate their efforts in such a manner that the gas industry will be able to offer the public a model kitchen as attractive as and more efficient than that which is to be offered by the two big electric manufacturing companies.

II. Appoint a director or working subcommittee to study local conditions and to formulate a definite and sound post-war merchandising policy.

From a sales standpoint the important thing is to be ready to go after new business to replace war business just as soon as war restrictions are lifted. In meeting the competition of the immediate post-war period the industry or company that gets going first with well-prepared sales plans is going to have a very material advantage.

It should be the duty of this committee to find out what the customers want, what appliances will be available for both the old and new markets and formulate a sound merchandising program. In cases where the company is to do its own merchandising, the committee should work out all details for setting up an adequate and efficient sales organization. In cases where the merchandising has been done exclusively through dealers, the committee should investigate carefully the present status of these dealers and determine how much help they will have to have in order to carry on a sound sales campaign. It is quite possible that by the end of the war many dealer organizations will have been so weakened that they will not be dependable for carrying out the merchandising effort which will undoubtedly be called for. This is a delicate question and an important one which should be answered before the real competition for domestic business starts. As soon as a decision has been reached regarding the merchandising policy this information should be passed on to the AGAEM. This is important, for the time and money that equipment manufacturers will devote to developing new and improved types of appliances will depend largely upon how aggressively the gas utilities propose to go after business.

In addition, the committee should draft a general advertising program and also do considerable missionary work among architects and residential builders. It would be well to have one or two industrial engineers on the committee, for the industrial field also has important business possibilities. It is altogether possible that recent developments, if properly advanced, will open up valuable new markets for gas, so that the post-war demands for industrial gas will be very large. In short, this committee is to be charged with the responsibility for making all necessary preparations for an aggressive sales campaign to start promptly when Victory Day arrives.

New England Gas Association

Approves Three Post-War Studies

THE post-war planning activities of the New England Gas Association took a definite step forward when the association approved the reports of three committees at its Dec. 3 meeting, according to a report from Clark Belden, executive secretary of the association.

Appliance Study Committee, Roy E. Wright, director of gas sales, New England Gas & Electric System, chairman. Committee members, representing 15 New England gas companies in four states, surveyed some 1500 customers, and the 10 pages of detailed replies have been consolidated into 21 tables. The questions pertained to fuel preferences, range models, and chief features of the post-war range. Range report ideas are as follows: construction (17); burners (15); ovens (7); controls (7); general (7); broilers (5); doors (4); pilot ignitions (4); flues (2); grates (2). The committee plans to present reports covering water heaters, refrigerators, house heaters, commercial equipment.

Kitchen Heating Committee, J. J. Quinn, general sales manager, Boston Consolidated Gas Co., chairman. The report showed an appreciable market for heater-type ranges, particularly in New England, where reporting utilities showed sales of such ranges as high as 30% of total range sales. Over 16,000 are now in use in this area. A research project on the development of a three-purpose range (cooking, space, and water heating) was endorsed, using the Institute of Gas Technology or any other appropriate organization.

Economic Survey Committee, James A. Cook, general manager, Lynn Gas & Electric Co., chairman. Developments in equipment and in manufacturing methods will determine whether or not coal gas can be manufactured economically in plants of relatively small size. The future use of oil as gas-making material will also depend on similar developments, reported the production subcommittee, E. L. Hall, chairman.

The transmission subcommittee, Peter J. Rempe, chairman, reported best interconnection possibilities as being within a 50-mile radius of Boston. The only other load densities warranting interconnection are in the Connecticut River Valley and New Haven areas, where substantial interconnection has already been accomplished.

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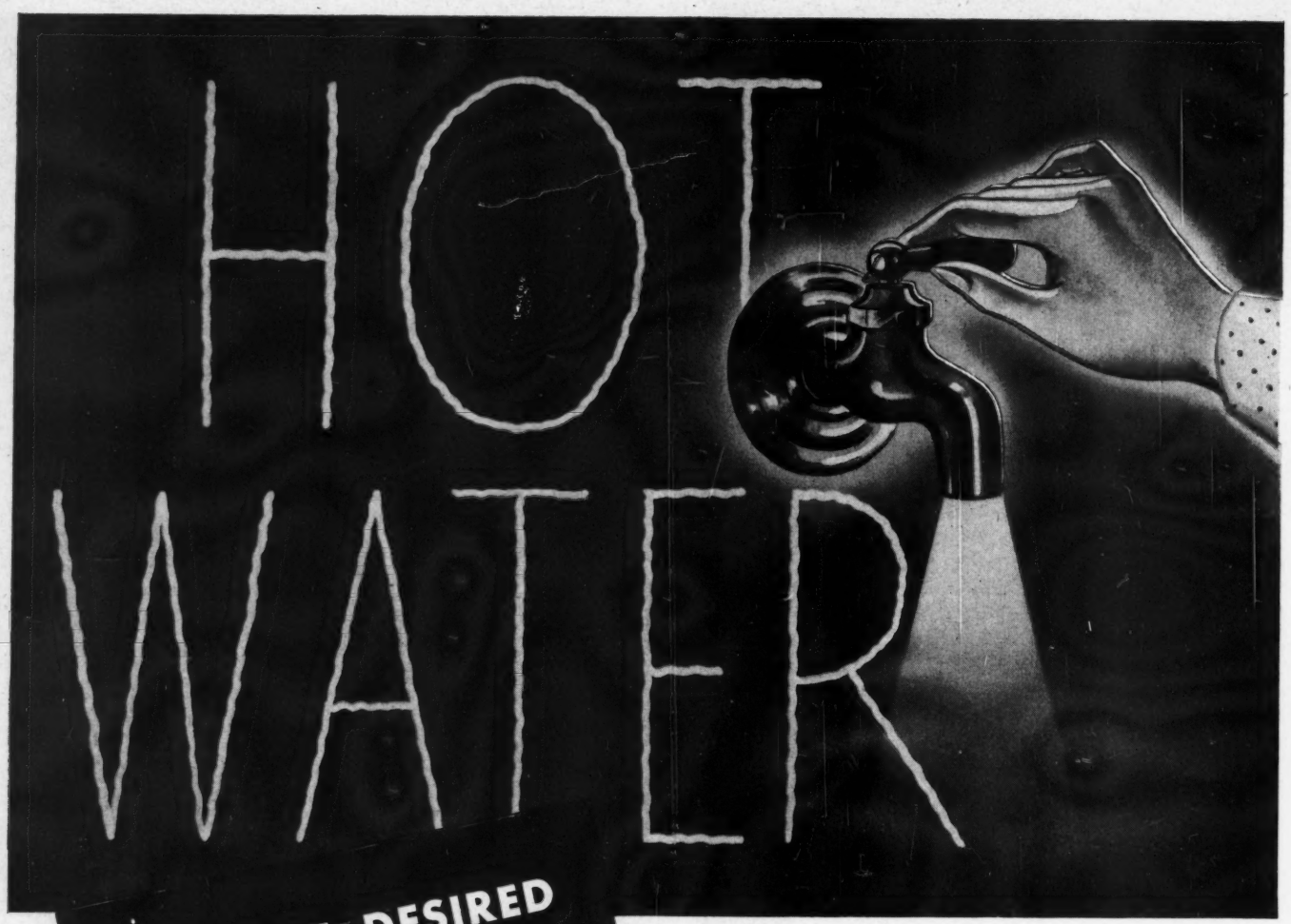

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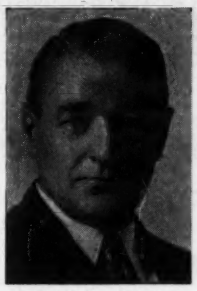
Post-war NOTES and NOTIONS



By STANLEY JENKS

Briefing Time

The facts are obvious. The longer this war lasts the greater the need becomes for industrial activity to make good the terrific economic losses caused by this war. It spells work and plenty of it, so that our economic system can survive. The war debts must be paid out of postwar profits. Every industry, including our fuel competitors, realizes as well as we do that its postwar ability to survive depends primarily on its ability to sell its products or services. It is equally obvious that some industries are not going to do so well as others. In fact, many of them are going to take a hell of a beating. And electronics, plastics and magical alloys won't save them either.

I take it every gas company is setting its local goal as a postwar load equal to today's, with its eye on the domestic market to offset possible losses in the industrial field. If so, such a program calls for active planning now, perhaps along the lines suggested in the forthcoming booklet, "Quick-Getaway Plan," announced for release by Surface Combustion. Advance notices state the "Quick-Getaway" plan is flexible, though designed mainly for utilities with limited sales personnel. It sounds like a session in the briefing room for all gas sales executives who are going to lead the postwar fight for the more complete gasification of these United States.

Cooperative Sales Policies

It ought to be axiomatic that every reputable manufacturer of acceptable gas appliances should have an equal sales opportunity in every gas company's territory. In other words, there is something sadly wrong with a gas company's sales policies when it freezes out a good manufacturer.

"We can't sell everybody's equipment" is the invariable answer, as I learned from sad experience. Nobody's asking you to sell everybody's equipment, Mister. You are just being asked not to be discriminatory in your own sales policies against these other manufacturers who can do business in your territory, but are not allowed by you to do so.

What are the main faults? First is that of wholesaling by the gas company. By doing so, a gas company automatically limits its dealer cooperation to the few lines it can warehouse, and other manufacturers are out of luck, in that they must compete by maintaining an expensive inventory to match the utility effort. The second fault is the practice of limiting time payment financing to the appliances wholesaled and retailed. Attempts have been made to liberalize this, but most of them I have seen really resolved themselves into propositions where the manufacturer carried the bag and put his reduced profit in escrow, until every last penny was collected.

The battle of the fuels is going to be a knockdown and dragout fight, if there ever was one. Every reputable gas appliance manufacturer has a promotional program, a gas-consuming product, and a desire for a fair break. He at least deserves an opportunity to produce in your territory, Mister, without having to fight your salesmen, your cooperating dealers' salesmen, and *your fuel competitor's salesmen too.*

The utility has everything to gain and nothing beyond a dubious merchandising profit at the most to lose. Total sales are the only proper criterion of an appliance sales effort, no matter who makes them.

Insuring the Cooking Load

Making full use of the cost advantage, however, is not the whole story of our postwar offensive in the postwar battle of the fuels. R. E. Ginna, Rochester Gas & Electric Corp., in his summary of the report, "Gas and Electricity in the Homes of Tomorrow," read at the recent AGA meeting in St. Louis, suggests that we have perhaps been too prone to accept the protection of, say, a one dollar a month differential between the cost of gas and electric domestic cooking as our best defense against the kilowatt lads and their cook-ooery contraptions. I think we are as guilty as hell, and the records of the unwarrantable encroachment of electricity in the domestic cooking field proves it. Despite the advantages we have in dependability, flexibility, economy and customer acceptance, we have let the electric boys cash in on the well-known willingness of the American public to pay a premium, by failing ourselves to convince Mr. and Mrs. John Q. Public that there is a definite premium in *modern* gas cooking.

Years and years ago, I remember F. M. Rosencrans, of Kansas City, urging a 10-year complete replacement of old ranges program at a midwest sales conference. Then, as now, it was painfully obvious that the finest insurance for the cooking load was a new gas range. How many gas utilities set their own and dealer annual replacement range sales quotes at 10% of their total domestic meters? How many made it? Very, very few, I'm afraid. Check total sales of AGAEM against total gas customers, discounting the new added customers, and you will readily see how we played the other fellow's game by allowing so many old relics to stand around, each and every one of them a potential push-over for a slick-tongued electric range salesman. In fact, he didn't even have to be slick-tongued. All he had to do was point a finger of scorn at the old gas gawdelpus and then point the same finger at a picture of his own glamor gal creation in porcelain enamel.

The time has come to face facts, as my old friend "Rosie" did at that midwest sales conference several years ago. Discounting the lead-in-the-pants theory too frequently advanced by our critics, I believe the real reason behind our failure to modernize our cooking load as quickly as it should have been done can be found in the fundamental thinking behind our sales policies. We have wanted our cake and our penny. We have wanted merchandising profits rather than load. We have muddied the dealer cooperative waters by trying to cooperate and compete at the same time.

Fortunately, we are going to be given another chance. This time, I hope, we are going to look at a modern gas range, not as a piece of tasty merchandising profit, but as an insurance policy, not only protecting our cooking load, but also making possible such incremental loads as automatic water heating, refrigeration and space heating. Right now we should make up our minds how much such an insurance policy is worth and be prepared to pay the proper premium.

CIVILIAN NUTRITION

The Utilities Must Help Teach Their Consumers To Eliminate Visible and Invisible Kitchen Waste

By DR. W. H. SEBRELL

Associate Director,
Food Distribution Administration,
Washington, D. C.

IN 1943 American farmers are setting a new food production record. Their all-out efforts will continue in the time ahead. We have enough food to meet our nutritive needs. Nevertheless, we must face the fact that the demand for food, both for civilian and war purposes has grown faster than the supply.

The food industries, the food distributors, and the utilities have made fundamental contributions to the promotion of initiative in the attack on the nutrition problem. Through their contributions of educational advertising and through the efforts of their workers they have reached uncounted homes. Food demonstrations have been given and nutrition classes have been organized. Assistance has been given to the improvement of industrial feeding facilities. Many other worth-while educational activities have been carried on.

Figures as to the educational contributions of the utilities and industry in the interest of good nutrition are very large. It is estimated that in 1942 the trademark and official food chart was reproduced through industrial advertising, printing and display materials more than 400,000,000 times.

Food conservation is becoming increasingly important. Reduction of physical and nutrient waste from farm to home is a war-time essential. It is estimated that 20% to 30% of all food produced in America is lost or wasted from the point of harvest on the farm to the home garbage pail.

Visible Waste: Analysis of the garbage collection figures of American cities shows an average of 300 lb. per person of food refuse per year. Of this amount, 225 lb. has been estimated to be edible. Analysis of garbage composition shows that bread and bakery products constitute an important part of the food wasted, but even more significant, in view of the general deficiency of American diets in fruits and vegetables which nutritional surveys have repeatedly demonstrated, is the high proportion of fruits and green vegetables found on municipal dumps.

During a single year in World War I, garbage waste in 18 cities was found to have been reduced by 10% through the efforts of an aggressive food campaign carried on by the Food Administration. Already there is evidence of some reduction in food waste in America, since this country got into World War II. If by aggressive measures we can save no more than one-third of the food now being lost between harvest and garbage pail, we can add to our food supply by this means as much as we can hope to achieve this year through increased production alone. Mobilizing the collective "know how" of American producers, middlemen, and consumers in food saving is one of the important tasks of today.

Tragic waste of food occurs on the kitchen front every day. Visible waste shows up in the household garbage pail in thick vegetable parings, wilted lettuce, shriveled carrots, edible fat trimmed from a piece of meat, moldy bread. It may be small in any one home, but multiply by the 34,000,000 homes in this country a single slice of bread wasted, a few lettuce leaves, vegetable parings unnecessarily thick—and the total would have fed a sizable army if the food had not been allowed to waste. "Clean plate" campaigns and appeals for reduced amounts of garbage are receiving fine cooperation from homemakers and other "food managers" and are materially reducing visible waste.

Invisible Waste: The loss of important food values (particularly minerals and vitamins) is occurring every day, too, in the home kitchen, and in hotels, restaurants and institutions. This is the waste that doesn't meet the eye; so it is a harder fault to correct. Only an intensive educational program, scaled to reach all the homemakers, cooks and chefs in the United States, can stop the invisible waste that is cheating the American public out of a considerable proportion of the vitamin and mineral content that nature has put into food.

The loss of food values comes from overcooking, draining away of cooking liquid, letting cut or sliced fruits and vegetables sit in a warm place exposed to the air, preparing cooked food too far ahead of the meal hour and holding it at serving temperature for a long time. Minerals and some of the vitamins are easily dissolved in cooking water, or are bathed out by steam and are dissolved in concentrated cooking juices. Some of the vitamins are destroyed by heat, especially when heat is applied for a long time. Some are destroyed by exposure to air.

To cut down on these invisible losses we must encourage cooking fruits and vegetables in the skin when that is feasible and serving the skin. We should feature the importance of serving some fruit or vegetable raw each day. Cooking should be done in the least possible amount of water and the cooking liquid should be served. Cooking time for many vegetables can be materially shortened.

Nutrition in Industry: The problem of adequate nutrition in industry is especially important. There are industrial nutritionists in all of the regional offices of the Food Distribution Administration. They function mainly as advisers to state and local groups and agencies such as the state and local nutrition-in-industry committees, industrial plants, and state health and labor departments. Nutrition-in-industry committees are active in every state.

These committees are composed of representatives of the state nutrition committees, state health agencies, medical and health associations, American Red Cross, labor and industrial organizations. They provide guidance on basic menu patterns and food values. They arrange for employee nutrition education through articles in plant and union magazines, posters, forums and talks to workers by nutritionists. They try to improve food standards of workers' families by changing food habits through instructions and demonstrations to wives of workers.

The Food Distribution Administration stands ready to advise proposals for improving in-plant food service. It provides assistance in deciding the type of feeding equipment best adapted to the needs of an establishment and advises on how to obtain that equipment. It brings to the attention of the War Manpower Commission and other agencies the problems involved in recruiting, training and retaining essential workers in restaurants and cafeterias. It consults with the Office of Price Administration about prices charged in eating establishments.

A big national campaign on Food Fights for Freedom is just getting under way. The four big points to get across to the public which will assure success in meeting our food difficulties are: *Produce, Conserve, Share* and *Play Square.* If everyone would do these things to the utmost we would all benefit—our military forces, our civilians and our Allies.

CORROSION AND PROTECTION

Of Buried Metallic Structures

Compiled and Abstracted by GUY CORFIELD, Technical Editor, GAS

1. Electrical Potential Phenomena

Control of Galvanic Corrosion of Iron

C. K. DONOHO and J. T. MacKENZIE, American Cast Iron Pipe Co., Birmingham, Ala. Excerpts from a paper, "Control of Galvanic Corrosion of Iron."

IN ARID soils or poorly conducting media the electrochemical corrosion of iron and steel is usually initiated by some heterogeneity of the environment, such as oxygen concentration cells, variations in acidity, etc. In more homogeneous and conducting media the causation potential of the electrochemical corrosion of iron and steel structures is more often due to differences in potential between elements of the structure itself. Both of these two distinct types of corrosion attack are encountered in soil corrosion of ferrous metals, the controlling type depending upon such factors as aeration, soil resistivity and moisture.[1]

Among structures subject to the electrochemical corrosion by potential differences in the material itself are pipelines in salt and/or marshy soils, condenser coils immersed in aqueous coolants, and others where the environment is conducting and relatively homogeneous.

In the "graphitic" corrosion of cast iron the causation potential is the very significant potential between graphite as cathode and ferrite as anode. This type of micro-cell galvanic corrosion is, however, not the most destructive, as the effect is a uniform attack over the entire surface and not concentrated on any particular area. In fact, the existence of the graphite-ferrite cells may be even beneficial in partially masking grosser intra-structural galvanic corrosion.

When, for some reason, there exists a distinct potential difference between two parts of a metallic structure in a conducting medium, the more cathodic part is protected from corrosion, but at the expense of the more anodic element which may be rapidly corroded to uselessness.

Under such conditions it is important that, if galvanic corrosion must occur, the more anodic element should not be a vital part of the structure. The intensity of the galvanic attack increases as the cathode area increases; therefore it is also important that the more anodic element should not be a relatively small part of the structure. This area effect is aptly illustrated by the case of copper pipe joined by an iron coupling. In a conducting solution the coupling will be rapidly corroded because it is the anode where all the attack is concentrated. Also such reactions are usually cathode controlled, and a large cathode area admits easier depolarization of the cathode by dissolved oxygen. In the opposite case, where a copper coupling is used on iron pipe, the corrosion is not so serious because the attack is spread out over the larger area of the iron anode and the access of oxygen to the cathode is relatively slight; therefore depolarization is extremely slow.

Iron and steel structures for use in environments conducive to galvanic corrosion are rarely so similar chemically and physically in every part that the entire structure is electro-potentially equal. Where the potentials of various parts of connected structure are left to chance, serious failures may occur if a small element is for some reason slightly but definitely anodic to the rest of the structure.

Iron can be made relatively more cathodic by alloying with more noble elements which form simple solid solutions with the iron. Two such elements commonly used are nickel and copper. Lamdau and Oldach[2] showed

[1]The Nature of the Cathode in the Rusting of Iron, by Sven Brennert. *Transactions* of the Electrochemical Society, 1939. Discussion by C. K. Donoho, p. 238.

[2]Corrosion of Binary Alloys. Electrochemical Society. Reprint 81-16, 1942.

GAS presents the first in a series of articles on the protection of buried metallic structures, a subject of vital importance in these war-time days of material shortages. The series will cover the following general ramifications of the protection problem: (1) Electrical Potential Phenomena; (2) Corrosion Coupons; (3) Pipe Coatings; (4) Cathodic Protection, Theory and Research; (5) Cathodic Protection, Application; (7) Miscellaneous—Soil Surveys, Special Problems, Anaerobic Corrosion.

The series has been compiled and edited by GUY CORFIELD, technical editor of GAS. In compiling this symposium, Mr. Corfield has used as source material more than 40 papers which were presented during the past 18 months before the meetings of the Fifth Bureau of Standards Soil Corrosion Conference, the American Gas Association, the Pacific Coast Gas Association, the American Petroleum Institute, and the Petroleum Industry Electrical Association.

Guy Corfield

GUY CORFIELD graduated in 1924 from the University of British Columbia with the degree of Bachelor of Applied Science in Chemical Engineering. For the past eight years he has been research engineer for the Southern California Gas Co., Los Angeles. In this capacity he has recently been in charge of the technical aspects of the installation of the company's butadiene project. Long active in the technical affairs of the gas industry, Mr. Corfield has served on numerous committees of the Pacific Coast Gas Association, being chairman in 1933 of the Association's Technical Section. His work with the American Gas Association has been continuous. This year he is serving on that Association's Chemical Committee, Gas Conditioning Committee, and on the Technical Advisory Committee for Domestic Gas Research Project No. 1—Domestic Gas Cooking. His connection with the AGA subcommittee on Pipe Coatings and Corrosion makes him a logical editor for this compilation of studies on the subject of corrosion.

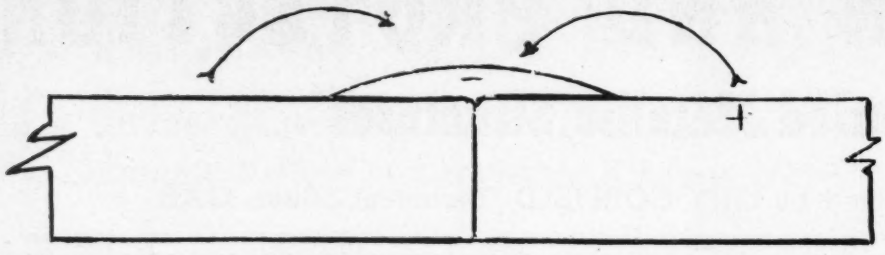


FIG. 1. Bronze weld.

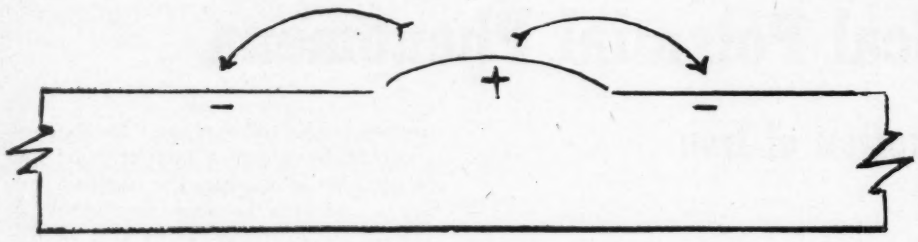


FIG. 2. Plain cast iron fusion weld.

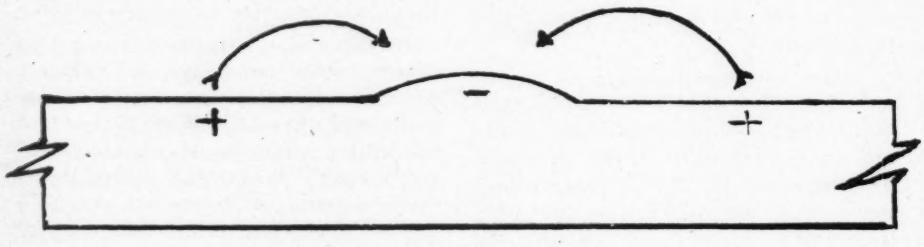


FIG. 3. Fusion weld—alloy cast iron in weld.

that nickel alloyed with iron progressively changed the potential in 4% NaCl. In their tests it was shown that 40% nickel changed the potential of pure iron 0.4 volts. Copper is usually cathodic to nickel and would be expected to have a greater effect in iron. However, copper is not as soluble in iron as is nickel. At equilibrium, only about 0.4% copper is soluble at normal temperature, but unless the metal is cooled very slowly, as much as 2% copper in iron will make an apparently homogeneous alloy. Alloying of steel or iron with a small percentage of nickel or copper makes a metal which under usual conditions is cathodic to otherwise similar unalloyed steel or iron.

Tests: In making fusion welds of cast iron pipe the operator usually tries to make the weld of the same composition as the basis metal. It has been found, however, that in many cases the weld, because of either chemical or physical dissimilarity, becomes anodic when the pipe is immersed in a conducting solution. In some services this will result in the corrosion being concentrated on the small area of the weld metal, causing rapid failure. Bronze welded pipe, on the other hand, is usually satisfactory because the weld metal is cathodic.

The polarity of welds may be determined most easily by what is known as the agar test. A machined section of the pipe wall through the weld is placed in a clear agar jell which contains dissolved sodium chloride, potassium-ferricyanide and phenolphthalein. The same solution serving as an electrolyte, any galvanic action starts immediately. Anode points are revealed by the fact that iron going into solution reacts with the potassium ferricyanide to produce a deep blue color in the jelly adjacent to any anode point. Cathode points are shown by a red color in the jell which is caused by the sodium hydroxide forming at the negative poles and changing the color of the phenolphthalein.

Fig. 1 shows a section of a bronze weld of monocast pipe in which the polarity was determined by this method. As may be seen, the weld metal is cathodic to the pipe itself so that the corrosion would not take place on the weld but would be spread out over the entire pipe. For this reason, bronze welded cast iron pipe presents no serious corrosion problem.

Fig. 2 shows a section of a cast iron fusion weld. In this case the weld metal is distinctly anodic to the rest of the pipe and under favorable conditions the galvanic corrosion might easily cause failure through concentration of the attack upon the weld.

Fig. 3 shows one way in which this problem is solved. In this case the fusion weld was made with a 1% copper alloy cast iron for the weld metal. Here the weld has become cathodic to the pipe wall, and therefore no corrosion problems would be expected.

The practicality of this solution was checked by specimen tests in hot aerated sea water. Where the weld metal was the 1% copper alloy, the basis metal would be corroded severely while the weld metal was barely attacked.

Another test in hot sea water made use of four specimens consisting of ¾-in. cast iron bolts with screwed-on nuts. In two cases the bolt and nut were of the same composition, in the other two the nuts were alloyed with copper. After one year exposure weight loss results were obtained as shown in Table 1.

From this test it is seen that the direction of the galvanic corrosion between bolt and nut may be controlled at will by alloying with copper.

A series of tests were initiated to determine the potentials developed by coupling plain cast iron with cast iron containing varying percentages of nickel and copper. Induction furnace heats were made and several bars poured with successive small additions of the alloy to the crucible. By this method a series of bars were obtained with all elements constant except the purposely added alloys, copper or nickel. Cells were set up using aerated 3% NaCl solution as the electrolyte and specimens 1.2 in. in diameter by ½ in. long. The 1.2-in. specimens were polished on one face, the other surfaces being protected by paint and

TABLE 1

		BOLT —Loss in Weight—		NUT —Loss in Weight—	
Bolt	*Nut*	*Grams*	*Per Cent*	*Grams*	*Per Cent*
Plain	Plain	36.6	12.6	21.1	19.5
Plain	Plain	31.7	10.2	19.3	20.5
Plain	0.5% Cu	53.5	17.1	5.0	4.0
Plain	1.5% Cu	57.5	16.4	1.9	1.6

paraffin, and a connection made with protected copper wire. One plain cast iron specimen was used in each cell and coupled with an alloy specimen. Attempt was made to measure steady state potential differences between the two specimens in each cell. So many complicating factors enter into the measurement of small corrosion potentials that the actual potential figures obtained in any one set of tests are not deemed reliable enough for presentation here. However, from these tests the following indications were obtained:

1. There is a sharp increase in potential differences between plain cast iron and nickel cast iron up to about 2% nickel.

2. There is a somewhat slower increase in potential difference between plain cast iron and copper cast iron up to about 2.5% copper.

3. From 3% to 5% nickel the potential differences decrease, probably because of the formation of hard martensite.

4. Above 2.5% copper the results are very erratic, probably because the alloys are not homogeneous.

5. Above 12% nickel the potential differences become very high as the alloy becomes austenitic.

Practical Applications: Fusion welded cast iron pipe are often used in refinery condenser coils where the coolant is often brackish water or sea water. Trouble was formerly encountered in the rapid corrosion of the welds where the weld metal chanced to be anodic. By making the weld metal of 1% copper alloy, this trouble has been largely eliminated.

In similar condenser coils the mechanical joints of the pipe are made with bolts which are a pearlitic malleable iron. A few years' experience showed that the bolts and nuts were failing while the pipe was still serviceable. The bolt and nut material was changed to a 1% copper alloy metal to make them cathodic to the pipe. Since the change the complaints of bolt corrosion have materially decreased. These low alloy bolts have been found valuable not only in condenser coils but also in other bolted joint cast iron pipelines which are frequently used for river and harbor crossings and for laying through marshes and swamps.

An interesting, though costly, mistake occurred in one of these condenser coils when a customer asked for 1% copper alloy pipe. By mistake these were furnished with the regular 1% copper bolts. Evidently the alloy in the pipe was sufficient to make the pipe again cathodic, for the bolts failed in a short time. More highly alloyed bolts were furnished for replacement.

The authors feel that there are many instances where the control of galvanic corrosion of iron will prove valuable.

Where and When to Use Insulating Flanges

WILLIAM E. HUDDLESTON, corrosion engineer, Cities Service Gas Co. Excerpts from a paper, "Where and When to Use Insulating Flanges," presented before the Petroleum Industry Electrical Association (Cathodic Section), Shreveport, La., April, 1942.

THE determination of feasibility is the first consideration to be regarded before adopting insulating procedures for reducing external corrosion on underground metallic structures. In certain cases it is possible to reduce severe external corrosion to practically nil by the proper use of insulators alone, while in other cases this procedure may prove to be costly and wholly ineffective.

Briefly, the identification of the underlying cause of corrosion existent in a specific case is the first step toward determining the feasibility to insulate. In general, insulating practices may be employed with good results when, by taking actual current readings, the corrosion is accountable by a measurable discharge of long line currents. It is therefore necessary to make a current survey and classify the type of corrosion under observation as one of "long line current" or of a type attributed to some other cause.

Corrosion from long line currents may involve any one of the numerous "corrosion cells" or it may be attributed to superimposed currents from an external source. Corrosion cells are more frequently caused by the metal contacting dissimilar solutions or solutions of varying oxygen concentration. Superimposed pipeline currents commonly originate from electric railway systems or foreign pipelines.

Current Surveys: A survey of long line currents (if they prevail) must be conducted with extreme care and accuracy, for these observations furnish the criterion to insulate and supply the data necessary to determine *where* to insulate.

Because of the variation in magnitude (and sometimes *direction* of flow) of long line currents it is often necessary to use two millivoltmeters. The two meters should check in accuracy to the nearest hundredth of a millivolt.

Other than taking a sufficient number of observations to secure an accurate record of line currents involved, there is no hard-and-fast rule for approaching a specific long line current corrosion problem. The usual practice is to observe the magnitude and direction of current flow on both sides of the corroding section, using a millivoltmeter on each side if a variation of current makes this necessary. It is sometimes good practice to make simultaneous observations along the line on each side of the corroding section for a reasonable distance, say 400 or 500 ft., first connecting a millivolt-

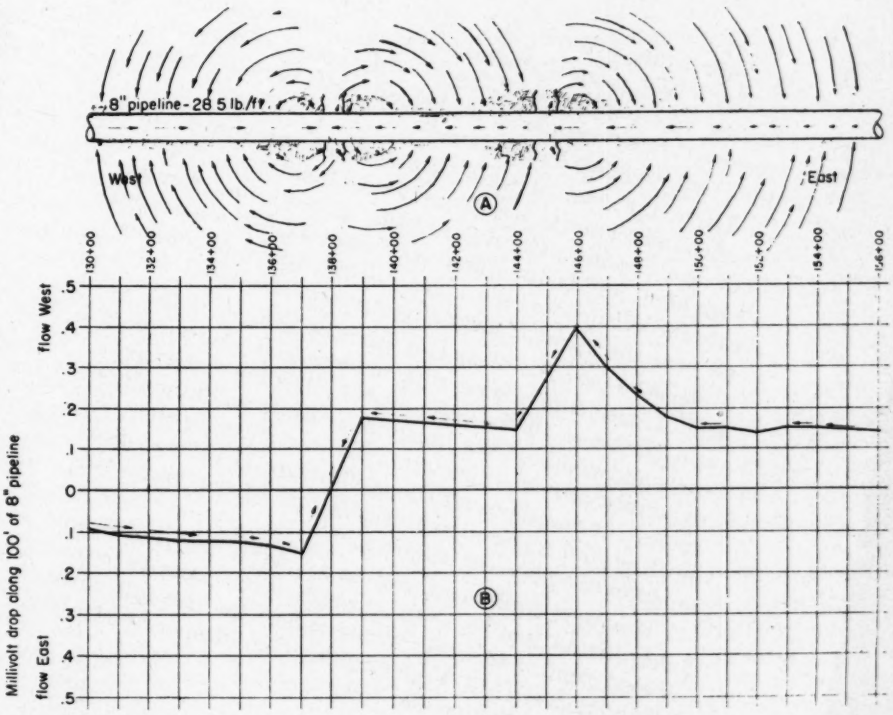


FIG. 1

THE NEXT ESSENTIAL

for the "Home of Tomorrow"

SERVEL'S NEW *All-Year* GAS AIR CONDITIONER

ARTS DEVELOPMENT CORPORATION
409 BROAD STREET · SUMMIT, NEW JERSEY

March 8, 1943.

Servel Incorporated,
Evansville, Indiana.

Gentlemen:-

The Servel All Year Air Conditioning Installation has proven most satisfactory. Specifically, the following seemed to stand out in our own observation and from remarks of our friends.

The summer of 1942 was unusually humid in our section of the country. Our friends told us of their troubles with mildewed rugs and furniture. We experienced no such trouble and credit our good fortune to the 616.5 gallons of water that the Servel unit removed from the air within the house.

From my experience with summer cooled offices I expected such the same results from the Servel installation. It was a pleasant surprise to find very uniform cooling throughout the house (a room to room check showed a variation of less than two degrees) and an absence of cold blasts of air.

During the first few days of operation we thought we had been "let in for something" from the operating cost angle because the unit seemed to operate so much. But when the season was over, with a total cost of $95.14 including gas, electricity and water, our confidence in human nature was restored. As a matter of fact we feel that next summer we can operate for around $75.00 and still maintain an inside temperature of less than 75° by a little care in the opening and closing of doors and windows. A small cost for the comfort derived from escape from over 95° F. temperatures and humidities of 96%.

Yours very truly

D. C. Hungerford

D. C. HUNGERFORD

DCH:C

Wins enthusiastic praise in 300 test installations

"Couldn't do without it." "Best investment I ever made!" "We point with pride to our good fortune in having this equipment." These are typical comments received from people who helped test Servel's new *All-Year* Gas Air Conditioner.

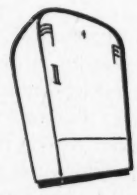
Three hundred of these installations were made in homes and certain types of commercial buildings throughout the country. Careful records of costs and results were kept, and frank opinions of users secured. In every case the verdict was the same . . . undreamed-of comfort all year round, at a surprisingly reasonable cost!

Servel's new *All-Year* Gas Air Conditioner is the result of nine years' engineering and research. One compact unit performs all six basic air-conditioning functions—cools and dehumidifies in summer, heats and humidifies in winter, provides air circulation and filtering the year round. It combines all the advantages of indirect-fired heating and absorption refrigeration, in one simple-to-operate complete air conditioner.

This new equipment will be available for your post-war clients just as soon as production capacity is released from war work. Write today for the full story about Servel's *All-Year* Gas Air Conditioner. Address: Servel, Inc., Evansville, Ind.

★

SERVEL GAS REFRIGERATORS are standard equipment in the nation's finest apartments.



SERVEL, Inc

America's Leading Makers of Modern Gas Appliances

meter close to the corroding of anode section with another millivoltmeter spanning the next 100 ft. away from the anodic section. After simultaneous readings have been taken over this portion, the meter nearest the anodic point is connected to span the 100 ft. of line to the opposite side of the other millivoltmeter, and observations are repeated. The "leap frog" measurements are carried on for whatever distance is necessary to reveal a clear picture of current conditions, and then the procedure is repeated along the line on the other side of the anodic point.

When to Insulate: In the foregoing discussion we stated that good results could be obtained by insulating if the corrosion is accountable by a measurable discharge of long line current. In making this statement we assume: (1) the corrosion to be of a local nature, that is, of limited extent, in contrast to that of a general nature which prevails throughout a considerable distance; (2) a "measurable discharge" is considered on the order of 0.1 amp. or more.

Where to Insulate: Having made an accurate location of the anodic sections and having decided to insulate, the question of where to insulate may also be answered by analysis of the long line current data. Bearing in mind that the rate of pipe deterioration is a function of the ratio of the cathodic area to the anodic area, it is obvious that our insulators should be spaced in such a manner as to sectionalize the anodic areas and exclude all possible cathodic areas.

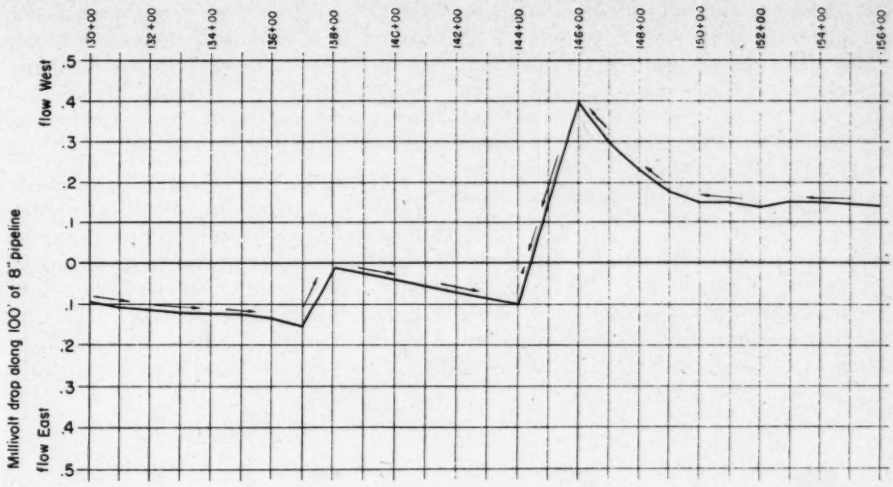


FIG. 2

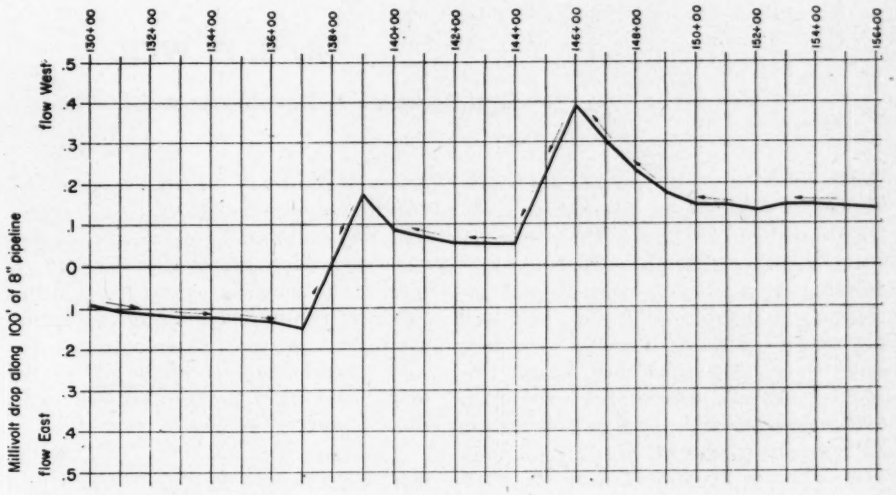


FIG. 3

Practical Examples of Insulating: Refer to Fig. 1, which shows a typical "corrosion cell" frequently encountered in pipeline maintenance.

The illustration in Fig. 1A shows the manner in which long line currents travel over a complete circuit. The current measurements are graphically illustrated in Fig. 1B and the anodic points are easily determined, one being located at 138 plus 00, and another at 145 plus 00. A third anodic point appears at 152 plus 50, but on close inspection of the curve we find that the current loss, as computed from the millivoltmeter indications and the weight of pipe involved, amounts to less than 0.1 amp., so we disregard this location because of its minor importance.

Further inspection of the curve in Fig. 1B shows that the line is cathodic for a distance of 500 ft. east of the anodic area at 145 plus 00, the line remains practically neutral (acting only as a conductor) for a distance of about 700 ft. to the west of this point and is cathodic over a distance of about 600 ft. in the portion of line to the west of 138 plus 00. It is quite obvious that one insulator should be installed in the line immediately east of 145 plus 00, and a second insulator will be required just west of 138 plus 00.

The question now arises as to the necessity for using more than two insulators to protect both anodic points, and it is usually necessary to make this decision before arrangements for cutting the line are completed. The 700 ft. of line between the two anodic points is the maximum area that could possibly resume interaction with either one or both of the two anodic points if only the two insulators were used. From the curve, however, we can see that both anodic points couple with cathodic areas independently of the intermediate 700-ft. portion of the line. Accordingly, we can assume that there will be little possibility that one anodic point will form a corrosion cell with this intermediate section, and we conclude that the two insulators would be adequate for both "hot spots."

Had conditions prevailed as illustrated in Fig. 2, we would have noted the tendency for this 700-ft. section to continue its action with the anodic point at 145 plus 00 after the line was insulated at the two places described above. Since corrosion at 145 plus 00 would likely proceed at a moderate rate, it would be to our advantage in this case to install a third insulator immediately west of 145 plus 00.

Refer to Fig. 3, which shows another possible condition. Apparently the 700-ft. portion of line between the two anodic points contributes to the corrosion at 138 plus 00, and would continue to do so with the line insulated only at the two places first described above. We can readily see that with this condition a third insulator would be desirable immediately east of 138 plus 00.

There are other possible conditions that might prevail over the 2600 ft. of line illustrated in the foregoing discussion, resulting with moderate to severe corrosion at the two locations under consideration. The three examples just given merely emphasize the neces-

sity of analyzing the local conditions in order to arrive at a definite solution. The determination of optimum spacing and the number of insulators required for protecting a series of "hot spots" distributed over several thousand feet of line may quite well be dependent upon field experience and good judgment.

Sometimes a well-defined soil resistivity survey made over the right-of-way will prove to be valuable in locating the sections that should most likely be insulated. Installation of insulators on both sides of the anodic points is advisable in cases of doubtful results. The maximum possible benefits will be derived, to say the least, and decisions from conjecture will be eliminated.

Locations Commonly Insulated: The most outstanding results have been obtained from insulating pipelines at certain stream crossings, main line taps, and at numerous other locations that were deteriorating from corrosion cells or from electrolysis. In addition, excellent results have been obtained in the reduction of corrosion on gas well casing and oil well tubing.

Locations Usually Not Insulated: Ordinarily, corrosion cannot be reduced substantially by insulating if the source of trouble is identified as one of the following causes: (1) bacteria, (2) peat bogs, (3) cinders, (4) barnyards, (5) sulfur water, (6) oil-saturated ground, (7) road crossings, (8) certain stream crossings.

(Further studies on the subject of Electrical Potential Phenomena will appear in the February issue of GAS.)

Production of Petroleum Substitutes

By B. H. WEIL

Gulf Research & Development Co., Pittsburgh, Pa.*

THE problem of the petroleum shortage is one which currently is attracting much attention. There can be little question that the supply of petroleum is of vital concern to the petroleum industry and to the users of petroleum products. Gasoline, in war and peace, is a substance whose importance to our way of life cannot be overestimated, and other products such as lubricants, fuel oil and diesel fuels also play a prominent role in both peacetime and wartime economies.

In the past few years new discoveries of oil have failed to keep pace with consumption, which has risen steadily. Substantial depletion of petroleum supplies in any case cannot occur in less than 30 to 40 years, but it does appear highly probable that within a few years it may become desirable to supplement United States petroleum production in some manner.

Methods of Petroleum Conservation: Several methods of approach to this important problem have been proposed, all of which seem only partial answers. For this very reason it is probable that no one of them will be used to the exclusion of others. Petroleum conservation, of course, is the first approach, since elimination of wasteful methods of production, refining and use obviously will prolong the life of petroleum resources. The importation of increasing amounts of petroleum from South America, as well as from other sources, is another method of solution, and one which seems likely to be adopted following the war, when oil tanker routes are no longer blocked by enemy submarines. This latter method has the advantage of favorable economics, since costs largely will be comparable to present American production prices if duties are removed (as should be done), but it has the disadvantage of making the nation dependent upon outside sources for what might be considered one of the most vital raw materials for war, should war come again.

Alternate solutions to the abovementioned ones concern production and use of petroleum substitutes of various types. Such widely differing methods as the hydrogenation of coal and the use of charcoal-burning trailers (as is being done in London) have been proposed. Many of these are already in use abroad, where the desire for national self-sufficiency has caused such nations as Germany and England to erect huge plants almost without regard to economics. Almost all these substitute methods are practical within certain limitations, but few seem to have economics which can enable them to compete with petroleum or, in the case of gradually increasing petroleum shortage, to augment supplies without greatly increasing costs. Those methods which seem to deserve the most attention are.

1. Production of shale oils from oil shales.
2. The hydrogenation of carbon monoxide (Fischer-Tropsch synthesis).
3. The hydrogenation of coal.
4. The blending of hydrocarbon fuels with alcohol made from agricultural products.

In the United States, research on substitute methods has been confined to a few far-sighted companies and such agencies as the Bureau of Mines, which is conducting experimentation upon coal hydrogenation and the Fischer-Tropsch process and, prior to 1930, conducted experiments on obtaining oils from oil shales. Further research is being advocated by Petroleum Administrator Ickes, and legislation to effect this is impending.

Thorough discussion of all these methods would be beyond the scope of a short speech. As regards the latter three methods, it must suffice to say that the Fischer-Tropsch hydrogenation of carbon monoxide would seem to have advantages over the hydrogenation of coal or the use of fuel alcohol as regards economics, especially if reactants were produced from natural gas. As regards wartime economics, also, the Fischer-Tropsch process requires less steel per barrel of motor gasoline per day for the erection of plants, but even here relatively large quantities of steel would be required, undoubtedly more than the wartime economy could support if large-scale production were desired. Economics as regards the use of even 10% alcohol blends probably will remain unfavorable, technical consideration aside, but such a process may eventually be adopted either through political means or a desire to extend petroleum supplies without regard to cost. Steel requirements for wartime plant construction would be prohibitive.

As regards the hydrogenation of coal, coal supplies certainly are adequate to support such a process for hundreds of years, but American econ-

*Reprinted from the *Quarterly Bulletin*, published July, 1943, by the Interstate Oil Compact Commission.

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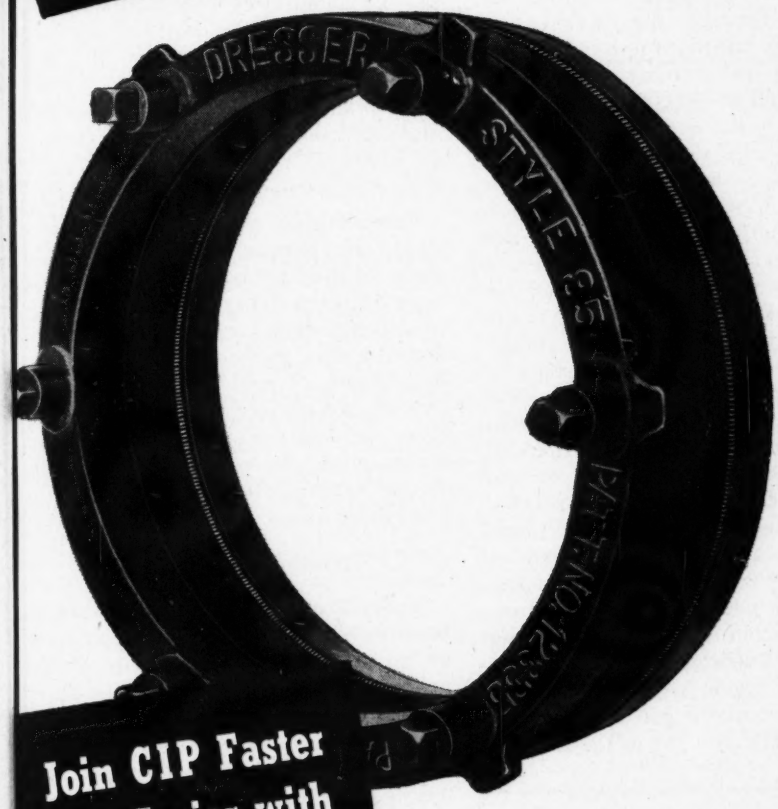

Remember in 1941 when the new Dresser Bellmaster Joint—Style 85—was first introduced? Superintendents and maintenance men saw at a glance that here was a faster, better way to join cast-iron pipe. Hundreds sent for a sample joint. Subsequent installation proved its superiority.

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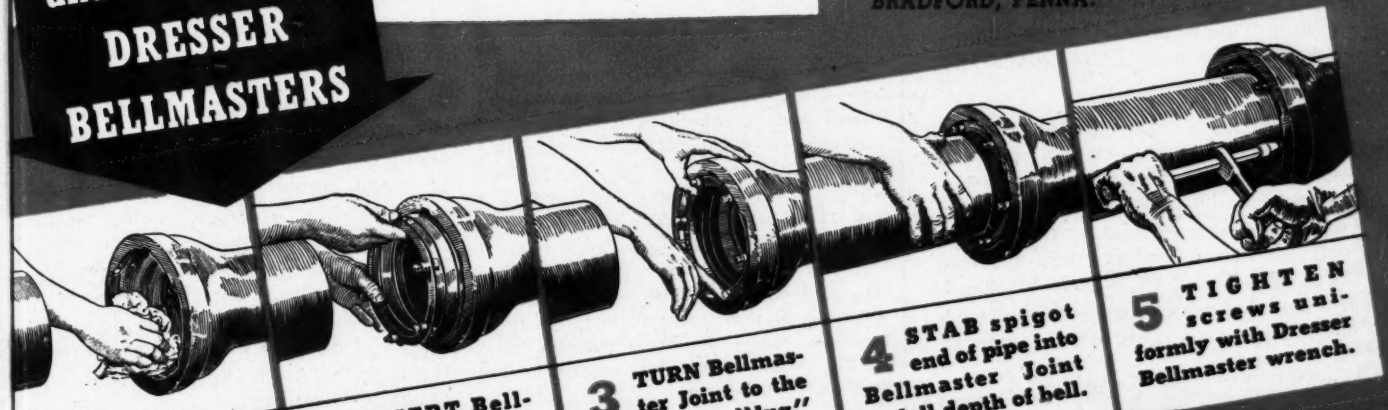


1 WIPE out spigot end of pipe and inside surface of bell in the usual way.

2 INSERT Bellmaster in bell-end of pipe with cap-screws facing out.

3 TURN Bellmaster Joint to the right until "lug" hits stop in bell.

4 STAB spigot end of pipe into Bellmaster Joint to full depth of bell.

5 TIGHTEN screws uniformly with Dresser Bellmaster wrench.

omy, left to itself, probably will not make use of this process until prices are forced much higher. An interesting comparison of coal and oil reserves has recently been made: It was stated that if present United States petroleum supplies were to be spread over the state of Ohio (41,000 sq. mi.) they would cover it to a depth of only ¾ in., while United States coal deposits would bury Ohio in a layer of 76 ft. deep.

Accurate costs per gallon of gasoline by all these methods are hard to estimate, but approximate figures would be: (1) Fischer-Tropsch gasoline, from coal—18c per gal; from natural gas—9 to 12c per gal.; (2) coal hydrogenation gasoline—16c per gal. (with a far-distant potentiality of 12c per gal.); (3) 10% alcohol-blend gasoline—10c per gal (based on alcohol at 40c per gal, which figure makes the use of such blends highly uneconomic, aside from the fact that only 10% of the fuel is a substitute). These figures are based upon costs and do not include profit; they compare with a present cost of about 5c per gal. for petroleum motor gasoline.

Shale Oils: Turning to a discussion sion of shale oils from shales, a welter of confusing "facts" may be found. At various times in the past, especially when petroleum shortage seemed to threaten, much attention was paid to this subject[2]. Unfortunately, little *scientific* attention has been given to this topic in this country since shortly before 1930, and petroleum technology since that date has developed to such an extent that in most cases complete credence cannot be given to this early work, which does, however, serve as background material. Complete clarity does not exist in the public mind as to the identity of oil shales, which are often confused with oil sands. In oil shales no oil is present as such; instead there exists, usually as a relatively small fraction, a complex organic "pyrobitumen" called kerogen, which breaks down when the shales are heated to yield petroleum-like oils, or which may be removed from the shales by such methods as extraction or hydrogenation.

Abroad, where commercial operations have been conducted on a rather small scale (by American standards), it has been the practice to obtain oils from the shales by heating them in retorts of various types, then refining these oils by modifications of standard petroleum techniques. Using such methods, considerable quantities of shale oils have been produced in such countries as Scotland, Esthonia and (most recently) Australia. The economics of such production have varied widely, since the oil content of shales throughout the world is far from uniform, those of Australia being unusually rich and those of Scotland being comparatively poor. Many American shales can yield a barrel of oil per ton of shale, an intermediate figure. In only a few cases have costs been competitive with petroleum, and even in these instances this has been true largely because crude petroleum was unobtainable locally and had to be imported.

Turning to the American picture, commercial production never has actually been attained, although a large amount of early research by private agencies and the Bureau of Mines was conducted through the pilot-plant stage, using modifications of foreign techniques. American oil shale reserves are estimated at 400,000,000,000 tons capable of yielding over 100,000,000,000 barrels of shale oils, which in turn might yield up to 60,000,000,000 barrels of gasoline. Most authorities seem to agree that shale oils can be produced, even by older techniques, at costs not exceeding $2 per barrel (estimates ranging from $1 to $2), and that gasolines of comparable specifications to those currently demanded can be produced at costs in the vicinity of 5 to 12c per gal. Modern petroleum technology would seem to indicate that such figures might be sustained in actual practice. Revolutionary new techniques in the handling of solids, analogous to the fluid catalyst process, may even make shale oils competitive with petroleum after adequate research is conducted. Hydrogenation of shale oils, analogous to the hydrogenation of crude residues or low-grade crudes, might prove of interest, although other modern methods of refining such as catalytic cracking, reforming and polyforming might be especially adaptable. By-products from shale oil refining are also worthy of mention, since large quantities of phenol, cresols and cresylic acids, which are valuable for the production of plastics, may be obtained. Steel requirements per barrel of gasoline per day probably would be lower than for the production of other petroleum substitutes.

It has been estimated that for a plant to mine the shale, then retort it to yield oil, and then thermally crack the oil to yield gasoline, the approximate dollar investment per barrel of motor gasoline per day might be on the order of $1500 to $3000. It must be noted that the comparable figure for the petroleum industry would have to include expenditures for producing facilities and oil transportation as well as refining plant investment; this figure was approximately $2500 in 1937, i. e., of the same order of magnitude. Such refining techniques for shale oils as hydrogenation would require a higher investment per barrel per day.

Considerable research probably would be required before a sound shale oil industry could be established, however, even though the future seems promising, since far less work has been done on this method than on the hydrogenation of coal or the hydrogenation of carbon monoxide. Other problems such as the disposal of spent shales, must also be considered, as well as the establishment of what would have to be a vast new mining industry.

Looking to the Future

Unfortunately, all of these petroleum substitute methods seem to look to the future. For any of them, plants probably could be erected immediately (if materials of construction were available), but such plants might be extremely wasteful of construction materials and labor, and it seems probable that their products would be highly uneconomic and, in some cases, of uncertain quality. Should petroleum be needed desperately, however, it may be necessary to resort to some such measures, which effort would bear indirect analogy to the erection of the synthetic rubber industry and might be accompanied with similar explosive consequences. Meanwhile, the petroleum industry is making every effort to encourage both increased production of petroleum from known sources and the discovery of new supplies, confident in the fact that, given adequate research, methods do exist that will produce substitutes for petroleum in the future.

Electrolux Refrigerators To the Rescue

Electrolux gas refrigerator owners in Galveston, Texas, came to the rescue of friends and neighbors recently when a damaging storm cut off the electricity in the residential sections of the city. In the absence of electric service, the refrigerators served entire neighborhoods, taking care of milk and other perishable foods. In the interest of caring for milk for babies and food for invalids in other stricken areas, the local Red Cross telephoned the Lone Star Gas Co. office to obtain a list of Electrolux owners for assistance in meeting the emergency.

[1]Monsanto Magazine 22, No. 3, 24 (1943).
[2]Weil, B. H., and Weinrich, W.: *Oil & Gas Journal* 41, No. 50, 48; No. 51, 73 (1943).

Venting of Tanks Exposed to Fire

EXCERPTS FROM a bulletin reprinted in the October, 1943, issue of the "Quarterly" published by the National Fire Protection Association. Authors: James J. Duggan (member, NFPA), C. H. Gilmour, and P. F. Fisher.

THE most severe hazard to which a vessel may be subjected is in most cases exposure to external fire and the attendant rise of internal pressure. Complete specifications for the release of this overpressure applying to unfired vessels are lacking, and the present standards in the opinion of the authors are inadequate.

Part 1 of the paper on which this article is based outlines tests and experience with vessels enveloped in flame, and sets forth an observed rate of heat absorption. Parts 2 and 3 state the theory on which the solution is based and express it mathematically in simple, useful formulas for unfired pressure vessels and atmospheric tanks in either gas or liquid hydrocarbon service.

Conclusions, Part One: The tests and experiences analyzed would indicate that 20,000 Btu. per hr. per sq. ft. of wetted surface exposed to fire is a safe minimum rate of heat absorption as a basis for the design of emergency relief capacities. Observations and calculations indicate this to be commensurate with an effective flame temperature of about 1400° F. completely around the vessel exposed. Modification of this rate is suggested for atmospheric tanks above 15 ft. in diameter, as outlined in Part Three of the paper, to allow for the lessened possibility of complete envelopment in flame and lengthened time required to heat the contents throughout.

Substantial fire-resistive insulation will, of course, lower the heat absorption rate proportional to the reduction effected in the heat transfer rate through the tank wall when the insulation is exposed to hot gas temperatures of 1400° F. The authors suggest that this lowered rate not be used in calculating the size of relief connection, although it may be reflected in the capacity of the relief device.

The authors realize that the observed rate of 20,000 Btu. is an increase over accepted practice (6000 Btu.) of considerable magnitude. However, the increase is in the direction of safety, and in view of the evidence collected, a substantial increase is needed. Naturally, many installations exposed to fire are so completely destroyed that neither rate can be substantiated on the basis of remaining evidence. Authorities and observers agree, however, that many of the failures were definitely due to excessive internal pressures and not to combustion explosions, as commonly believed.

Conclusions, Part Two (Pressure Vessels): The formulas proposed give relief capacities much greater than are at present employed. The results may be compared with known proposals or standards, (Fig. 1). On this it will be noted that Fetterly's formula gives relief areas averaging about 10% in excess of formula (1) at the pressure plotted; that formula (1) for volatile liquids gives relief areas about 50% greater than those specified for steam; and that formula (1), when modified by the properties of water, gives relief areas about 50% less than the regula-

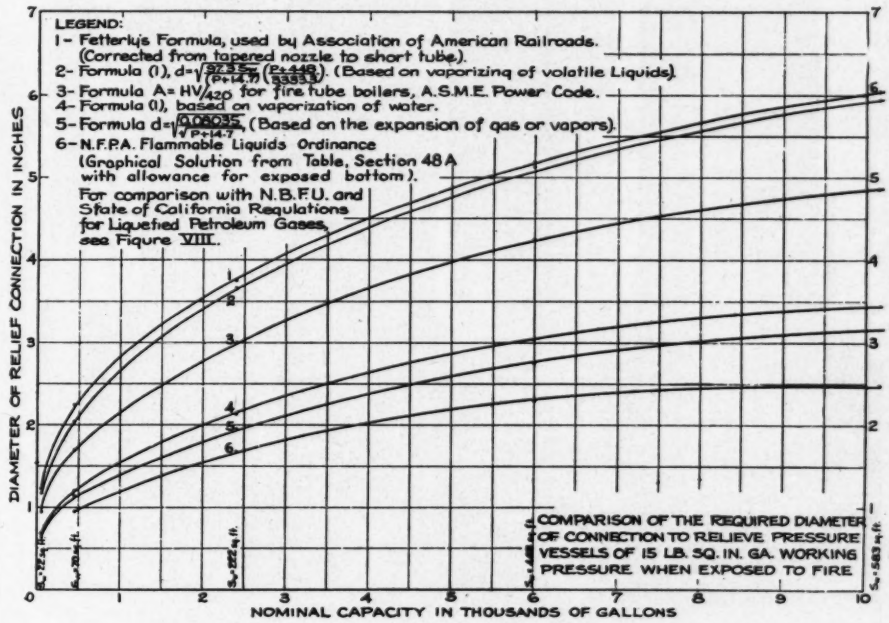

LEGEND:
1- Fetterly's Formula, used by Association of American Railroads. (Corrected from tapered nozzle to short tube).
2- Formula (1), d=√(27.3 Sw/(P+14.7)) (P+448)/(3333.3). (Based on vaporizing of volatile Liquids)
3- Formula A= HV/420 for fire tube boilers, A.S.M.E. Power Code.
4- Formula (1), based on vaporization of water.
5- Formula d=√(0.08035/√P+14.7), (Based on the expansion of gas or vapors)
6- N.F.P.A. Flammable Liquids Ordinance (Graphical Solution from Table, Section 48A with allowance for exposed bottom).
For comparison with N.B.F.U. and State of California Regulations for Liquefied Petroleum Gases, see Figure VIII.
COMPARISON OF THE REQUIRED DIAMETER OF CONNECTION TO RELIEVE PRESSURE VESSELS OF 15 LB. SQ. IN. GA. WORKING PRESSURE WHEN EXPOSED TO FIRE
DIAMETER OF RELIEF CONNECTION IN INCHES
NOMINAL CAPACITY IN THOUSANDS OF GALLONS

FIG. 1. Comparison of the required diameter of connection to relieve pressure vessels of 15 lb. sq. in ga. working pressure when exposed to fire.

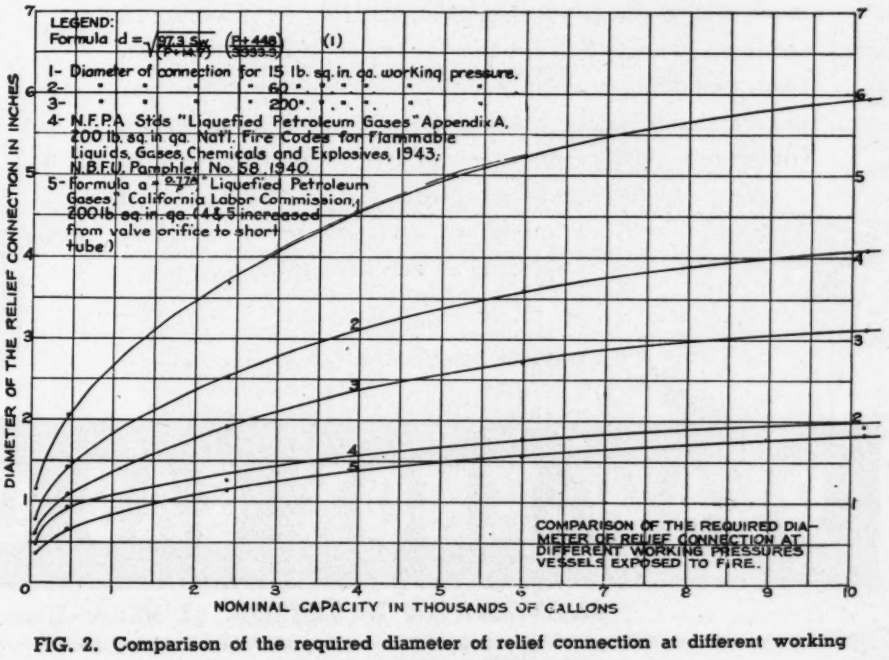
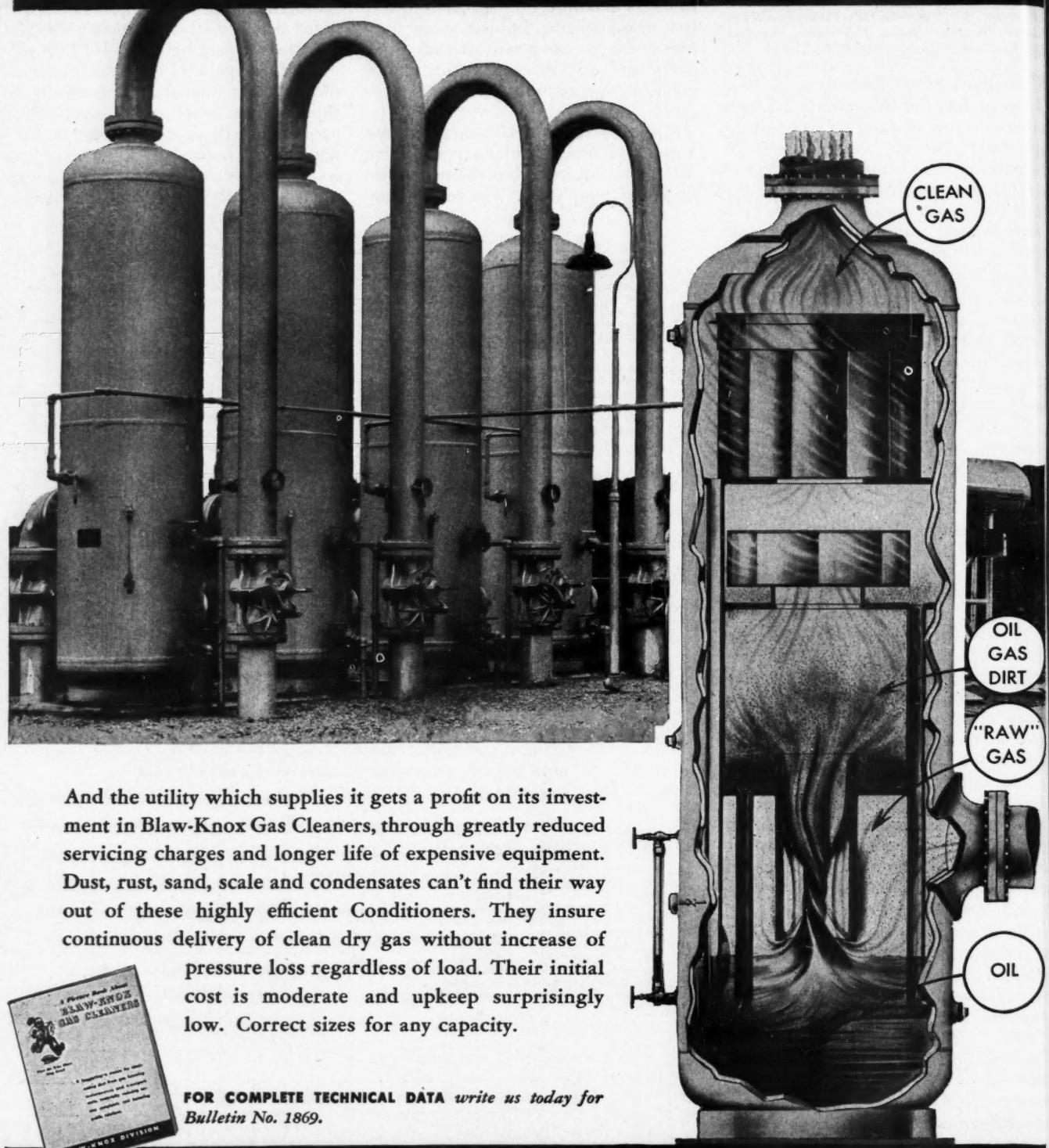

LEGEND:
Formula d= √(27.3 Sw/(P+14.7)) (P+448)/(3333.3) (1)
1- Diameter of connection for 15 lb. sq. in. ga. working pressure.
2- " " " " 60 " " " " "
3- " " " " 200 " " " " "
4- N.F.P.A. Stds "Liquefied Petroleum Gases" Appendix A, 200 lb. sq. in ga. Nat'l. Fire Codes for Flammable Liquids, Gases, Chemicals and Explosives, 1943; N.B.F.U. Pamphlet No. 58, 1940.
5- formula a + 2.17A "Liquefied Petroleum Gases," California Labor Commission, 200 lb. sq. in. ga. (4 & 5 increased from valve orifice to short tube)
COMPARISON OF THE REQUIRED DIAMETER OF RELIEF CONNECTION AT DIFFERENT WORKING PRESSURES VESSELS EXPOSED TO FIRE.
DIAMETER OF THE RELIEF CONNECTION IN INCHES
NOMINAL CAPACITY IN THOUSANDS OF GALLONS

FIG. 2. Comparison of the required diameter of relief connection at different working pressures, vessels exposed to fire.

Louisburg, Kansas, Gets CLEAN GAS



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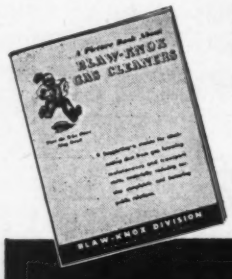

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SUGGESTED VENTING FOR ATMOSPHERIC STORAGE TANKS

Tank Capacity (Gallons)	Relief Size (I. P. Size) Normal	Relief Size (I. P. Size) Emergency	Minimum Capacity (cu. ft. air per hr. at 60° F. and atmos. pressure) Normal‡ (at 1 in. water press.)	Minimum Capacity (cu. ft. air per hr. at 60° F. and atmos. pressure) Emergency (at 3-in. water press.)
50	.....	2-in. vent	.....	6,150
50 to 100	.....	3-in. vent	.....	13,400
100 to 300	.....	4-in. vent	.....	24,600
300 to 1000	.....	6-in. vent	.....	55,400
1000 to 2000	1½-in. vent	8-in. cover	1,920	98,500
2000 to 4000	2-in. vent	10-in. cover	2,805	153,800
4000 to 10,000	2-in. vent	12-in. cover	3,660	221,500
10,000 to 20,000	3-in. vent	16-in. cover	6,180	394,000
20,000 to 50,000	3-in. vent	20-in. cover	8,230	615,500
50,000 to 100,000	4-in. vent	20-in. cover	12,500	615,500
100,000 to 150,000	4-in. vent	22-in. cover§	14,620	744,000
150,000 to 200,000	1 4-in., 1 3-in. vents*	22-in. cover§	18,100	744,000
200,000 to 400,000	1 4-in., 1 3-in. vents*	24-in. cover	22,820	886,000
400,000 to 800,000	6-in. vent	24-in. cover	32,900	886,000
800,000 to 1,100,000	1 6-in., 1 3-in. vents	24-in. cover	41,100	886,000
1,100,000 to 1,300,000	1 6-in., 1 4-in. vents†	24-in. cover	47,500	886,000
1,300,000 to 1,800,000	8-in. vent	24-in. cover	58,450	886,000
1,800,000 to 2,000,000	2 6-in. vents	24-in. cover	65,800	886,000

*Although one 6-in. may be cheaper, the two units have the advantage of multiple devices.

†Although one 8-in. may be cheaper, the two units have the advantage of multiple devices.

‡To be used for selection of the normal relief devices. This capacity is included in that for the emergency requirement.

§This is not a standard pipe size.

tions for steam boilers. (Comparison of unfired pressure vessels with steam boilers is hardly justified, but it does show that the results are in the logical direction when it is considered that about six times as much heat is required to vaporize water as compared to the volatile liquid considered.

Also appearing is Curve 6, showing relief diameter sizes based upon 6000 Btu. per hr. per sq. ft. of wetted surface. The relation between Curves 2 and 6 depicts the suggested increase of about 2.2 times in the diameter of the relief area which the authors believe will eliminate failures due to overpressure during fire exposure. It may also be noted that the calculated relief diameters for gases are about one-half of those for volatile liquids at 15 lb. per sq. in. gage working pressure.

Fig. 2 has been included to show how the relief area as calculated by formula (1) varies with pressure.

Conclusions, Part Three (Atmospheric* Vessels): When the volatile, liquid contents of a vessel are absorbing heat at the rate of 20,000 Btu. per hr. per sq. ft. of wetted surface exposed, the required inside diameter of the relief connection to limit internal pressure (not to exceed 0.50 lb. per sq. in. gage) to a specified maximum is

$$d = \sqrt{\frac{0.913\ Sw}{\sqrt{P(P+14.7)}}}$$

in which d is in inches, Sw is wetted surface in sq. ft., and P is pressure in lb. per sq. in gage. This formula may be applied as follows:

*Covers pressures not to exceed 1 in. water external and 0.50 lb. per sq. in. gage internal pressure.

Portable Unit Takes Bottom Hole Pressures

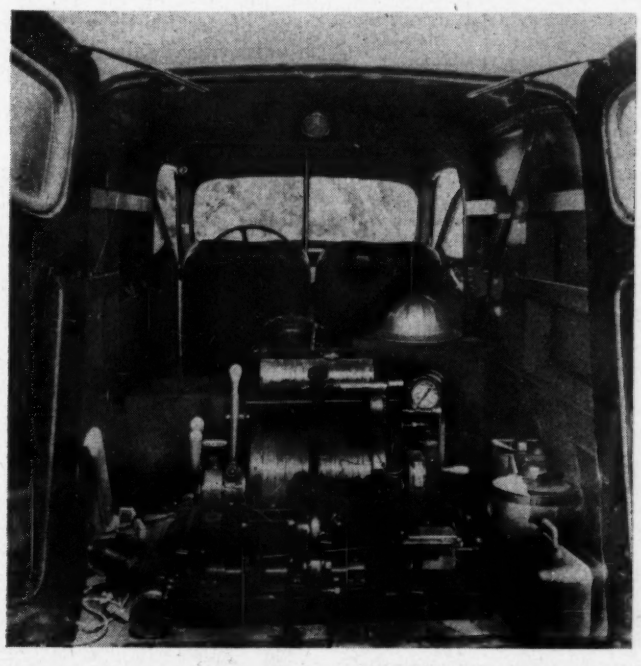
THE Oklahoma Corporation Commission, through its conservation department, is using to good advantage a complete portable unit for taking bottom hole pressures of oil and gas wells.

The equipment already has been used in testing pressure of oil wells in the Medrano sand of the West Cement field and the West Edmond field and in making measurements in the Chickasha gas field.

The equipment includes a winch and steel line unit to which a bottom hole recording gage can be attached. A maximum recording thermometer for taking temperatures in the well also can be attached to the equipment. The unit is enclosed in a panel truck, also purchased and owned by the department.

Dan O. Howard, petroleum geologist of the department, says that the equipment also is helpful in correctly determining casing-head and bottom hole pressures in gas wells which contain a considerable amount of fluid, in order to adjust pressure to conform to conservation formulas.

The conservation department in recent months has been assigned the task of making pressure tests in several areas, including the Oklahoma sector of the great Hugoton gas field. By owning this equipment the commission can speed up these tests and accomplish a better conservation job, Mr. Howard says.



Interior view of truck used by oil and gas conservation department of Oklahoma Corporation Commission. Shown are the testing unit, the winch, and steel line device by which bottom hole pressure and temperature recording instruments are lowered into oil and gas wells.

TRENDS AND COMMENT

Natural Gas Recognized

The American Gas Association now has a natural gas and a manufactured gas department, each with a vice president of the association as chairman. The vice presidents are ex officio members of the Finance and Control Committee.

Voting on the amendments to reorganize the association closed on Jan. 2, resulting in 1821 ayes, 7 noes, 38 incorrect ballots. For comment we refer you to Mr. Taylor on page 9.

The Supreme Court Decides

The Supreme Court in its decision of Jan. 3 upheld the Federal Power Commission in its suit against the Hope Natural Gas Co., allowing FPC to throw out the "cost-of-reproduction" principle in establishing the company's rate base. Effect of the decision was to lower the company's rates by $3,600,000 per year (based on original cost) and to propound the opinion that FPC is "not bound to the use of any single formula or combination of formulæ in determining rates."

Justice Douglas in reading the majority opinion stated:

> It is not the theory but the impact of the rate order that counts. If the total effect of the rate order cannot be said to be unjust and unreasonable, judicial inquiry under the act is at an end.
>
> The fact that the method employed to reach that result may contain infirmities is not then important. Moreover, the commission's order does not become suspect by reason of the fact that it is challenged. It is the product of expert judgment which carries a presumption of validity . . .
>
> Nor is it important to this case to determine the various permissible ways in which any rate base on which a return is computed might be arrived at. For we are of the view that the end result in this case cannot be condemned under the act as unjust and unreasonable from the investor or company viewpoint.

Thus, the regulatory bodies may fix on any base they choose as long as they are not unjust. And only in the case of rank injustice may their decisions be brought before the court for review.

Life on a Cloud

Being just an ordinary human being and not much of a believer in magic, we have come to view our gas appliances as we do our friends, making some allowance for their shortcomings.

Even in California, where the elements have lately been on their annual binge, there are, contrary to popular opinion, days flushingly hot, numbingly cold. We experience such fluctuations in the weather with some discomfort. And this in spite of a rather expensive gas appliance designed to level off the extremes and make life flow in pleasant, even-temperatured complacency throughout the year. We don't complain about it (we've been in Chicago)—when it gets too hot, we reset the thermostat, and when it gets cold, a great effort, we arise from the couch and push it up again. In the summer, when the Mojave heat comes over the mountains, we turn on the blower fan, lie on the floor in front of the register and bathe our perspiring face in the faint breeze which comes therefrom. Sometimes we just forget the whole thing and go out and root around among our gophers and orange trees.

Into this accepted compromise between weather, gas appliance and bodily temperature there has crept a discordant note. Tomorrow the latest AGA advertisement states (January, February and March in the better magazines): "We can wave our hand and have any climate we wish." (See cut.)

After noting the ecstatic expression on the face of the sturdy gentleman who passes his days reclining against a palm tree, flanked by appropriate female companionship and dangerously within bombing range of what appears to be a seagull, we are becoming dissatisfied with our compromise.

AGA's current advertisement.

From the fantasies of today must grow the realisms of tomorrow. We think the gas industry means what it says, and as one of its 19,450,000 loyal supporters, are looking forward eagerly to this fancifully indolent and button-pushing future. But the jump down from fantasy to button-pushing strikes us as a long one, requiring men and thought and plans and work and assembly lines.

Yes, we too want to recline peacefully on a cloud-like desert island, sniffing a banana, with convenient female companionship. And we jolly well hope the gas industry doesn't let us down.

Reconversion Notes

Metals: The scarcity period seems about over and makers of Victory models are advised to review production schedules, since there is a possibility that there will be enough metal by the second quarter to warrant an end to the Victory model program. While there are still problems of facilities, manpower and materials to be solved, the present major difficulty in the appliance production program is how to reactivate it without too great a disturbance to pre-war competitive conditions. The answer will probably come with the development of a national plan for reconversion.

Floor Furnaces: WPB is considering allotting enough materials to make 30,000 to 40,000 furnaces in 1944. Limitation Order L-173 will likely be killed, the new and eased restrictions to come under L-23-c.

Water Heaters: Plans are now being formulated for the production in 1944 of 800,000 to 1,000,000 water heaters. Manufacturers in labor areas 1 and 2 may have trouble unless production can be upped with present personnel.

Coal Advertising

The coal industry has swung into high gear on its long awaited $400,000 national advertising campaign with the placing in December by the Bituminous Coal Institute of schedules in seven national magazines and a long list of business publications.

Motif for the campaign comes not so much from the expensive gray matter of American advertising genius as it does from a down-to-earth research job. The campaign seeks to answer the many questions in the public's mind concerning the coal industry.

To do this the Bituminous Coal Institute last June undertook a street interview campaign, asking those judged

to make more than $2500 per year a series of questions, including what they thought of John L. Lewis. At the close of the interview, the interviewee also was given a chance to ask his questions. Typical ones: "Why are there more strikes in coal mining than in other industries?" "Why don't you give miners better working conditions?"

The questions and answers have been used in the institute's new copy with the heading, "What do you want to know about the coal industry?"

First ad, a token one appearing in October, emphasized coal as America's chief source of power, and that in 1942 more coal was produced than ever before, despite loss of 70,000 trained workers to the armed services.

Budget for the current campaign expires in April, but more dollars are expected to be on hand to do the coal industry's advertising job in 1944.

Ray of Hope

The American business man, long submerged under a mounting pile of government forms, reports, requests for information may take heart. The Federal Power Commission on Dec. 31 told the nation's major electric utilities that they need not prepare 36 schedules in submitting the annual report form (FPC Form No. 1) covering the year 1943. The action was taken in recognition of efforts to conserve time and labor and in recognition of the shortage of trained personnel.

Future of the "Big Inch"

Now that the two emergency oil lines are doing their war jobs, thought is being given to the uncertain future of these government-owned carriers.

Several groups studying the matter have found that comparable pre-war rates for carrying a barrel of oil from the Gulf Coast to New Jersey are: railroad, $2.20; pipeline, 76c; tanker, 20c.

It is estimated that the United States will have a post-war tanker fleet of 750, the greatest ever, and many of these will be new, fast, and large, foretelling even lower tanker transportation costs. Railroads and barges may be thrown out as major factors in petroleum transportation.

It is unlikely, however, that the "Big and Little Inch" pipelines will be junked or allowed to rust in the ground. Combined they can carry daily 535,000 bbl. of petroleum products from the nation's principal oil-producing centers to the eastern manufacturing districts.

One possibility is that of turning the lines, which cost about $160,000,000, back to the petroleum industry. This possibility would depend largely on the post-war price set by the government. Petroleum officials seem to be confident that the lines, if operated at capacity, could transport products at a 25c-per-barrel cost. This would compare favorably with tanker costs.

Another possibility would be the conversion of the lines to natural gas transportation.

This latter possibility is now up for discussion with the House small business committee investigating the feasibility of constructing a gas carrier between Texas and West Virginia in view of changing war conditions.

With the submarine menace under control, it is apparent that oil shipments by barge and tanker will likely be resumed in the latter half of 1944. Therefore proposals have come from several sources that (1) the major portions of the Tennessee Gas & Transmission Co. line be abandoned; (2) one of the WEPipelines be converted to gas in time to meet next winter's demands.

If the 24-in. were to be converted, Tennessee Gas would be asked to revise its winter construction plans to connect the Longview terminus of the "Big Inch" with the Corpus Christi gas producing area. From the government standpoint, the WEPipelines, if operated at high capacity, are expected to practically pay for themselves by mid-

Pittsburgh Company Has New Home Service Headquarters

The opening ceremonies of the new home service headquarters of Equitable Gas Co., Pittsburgh, Pa., were attended by heads of local women's organizations; city and suburban gas appliance dealers; executives, sales department heads, and home service directors of other gas companies; editors of women's pages in Pittsburgh newspapers; and others.

In addition to the services mentioned on page 50 of the December, 1943, issue of *GAS*, the Equitable home service department is prepared to provide instructors for the Red Cross nutrition course, and to conduct special seasonal classes.

New home service headquarters of the Equitable Gas Co., Pittsburgh, which were made necessary by increased use of facilities by customers. In the foreground is a reception room where customers are greeted, and receptionist makes inquiries as to their exact problems. The test kitchen is shown in the rear.

Staff of home service division of the Equitable Gas Co., showing also the new model kitchen with seating accommodations for 25 women for small group demonstrations. Left to right: Mrs. Viola Doyle, Miss Anne Gallagher, Miss Jenoise Wherry, Miss Kathryn L. Barnes, Miss Jean Burch, and Miss Gene Lydick.

LETTER FROM AUSTRALIA

JEROME B. PALLOCK, U. S. A., wrote the following letter while undergoing treatment for a leg injury in a hospital in Australia. Prior to his induction, Mr. Pallock was a meter reader for Southern California Gas Co., Los Angeles. L. A. Blomgren supervises meter readers for the utility.

AMERICAN RED CROSS

Australia
October 11, 1943

Hello, Mr. Blomgren:

I spent the day as an emissary of good will. It really was a most unusual manner in which to pass away a day of liberty, but I was tired of trying to drink up all the beer in the local pubs. They brew too much of the stuff.

I wanted to get a slant on the manner in which the local gas works functions, so I went to a building that was labeled (censored), and the fact that a Yank was in the building caused quite a stir; they knew I wasn't there to pay a bill or buy a new stove, so they shot questioning glances in my direction. I explained to one of the salesmen that I wanted to secure a little info on the system they use for reading meters. He was as courteous as could be; went to the phone and called someone; then came back and gave me directions to a Mr. Jones' office. I told him I didn't want to bother anyone that was busy, but he said to go ahead.

Mr. Jones turned out to be the general manager; he told his secretary not to bother him, and we went to work. I am passing on to you a few facts he related to me regarding their methods. I in turn supplied him with our system and policy. You may know some of these things, but here goes.

The reader carries a regular bound and glued book that has the dials, meter location, printed in, in duplicate; he marks the position of the hands (the government requires them to do this), enters the amount, makes the subtraction, and then enters the amount owed. He figures this form from a chart. I enclose one that he gave me. Then he leaves the bill at the house. You can see that he can't make many readings a day, doing all this; they average 160 daily.

If a reader makes over 10 mistakes monthly he calls him in and they talk it over. The company policy (like ours) is very good regarding treatment of employees.

The reader hardly ever comes down to the office; his books are delivered to his home. The employee that delivers them leaves the next day's and picks up yesterday's, so the reader always has two books in his possession. He reads the same book every month. They don't have any curb meters; most of the meters are outside and are boxed. He said the men prefer matches to flashlights. I showed surprise at this, but he said they have never had any trouble with matches and the men use them to frighten off the dogs.

They have about 60 readers, seven of whom are women. He didn't want to hire the women because he claims they only do about 70% of the work. But the manpower commission told him he would have to sack the last 12 men he hired and replace them with women. He did this, but it so happened that this last group of men were retired veterans, so they were rehired. He still had the women, so he decided to use them for propaganda purposes and gave them pieces of books in populous areas so people will be convinced they are actually using them and releasing men for war work. As it is, most of the men are retired veterans, but he said people still think all men should be in war work.

The readers work from 9 to 4 and get an hour for lunch. They are paid from 9 to 5. The company figures they need the extra hour to check the book at home. They are given two weeks sick leave and a two-week vacation annually. The sick leave is increased to four weeks after five years' service.

They are placed on a three-month probation when first hired, then serve an additional nine months before becoming regular staff members. They are given a raise at the end of the year and then an increase at each two-year interval until they have served 15 years, at which time they reach the maximum pay. The company serves 250,000 people and has about 2000 employees.

They also maintain slot meters but don't have very many. To enable you to figure the chart, a "pound" is worth about $3.28 our money. There are 20 shillings to the pound and 12 pence to the shilling. All figures are written in this manner, £2/6/1 pounds, shillings and pence, respectively.

He became so enthused that he called his chauffeur and had him bring the car around and we drove out to one of the outlying districts where they have recently established neighborhood offices. This one was in a former company display room. These are only temporary and will be discontinued when the war ends. He showed me the entire layout, books included.

We then drove back to town. I thanked him for all his trouble. He said it was a pleasure—he meant it, too. He is a very charming gent. Told me to come back if another question occurred, but I think I covered most everything.

It was a very interesting experience for me, and also educational. Mr. Jones sends his greetings to you—hands across the sea and all that.

Lights are about to go out, so I'll close. My leg is almost in top shape, so I suppose I'll be going back to duty soon.

Respectfully,

JEROME B. PALLOCK.

1944. Catch here is the many breaks reported in both lines, one news report stating that completion of the 1476-mile "Little Inch" was delayed as much as two months by some 60 or 70 breaks, most of them in welded pipe furnished by Youngstown Sheet & Tube. Still it is thought that an arrangement might be made with Tennessee Gas to lease one of the lines for a 10-year period with an option to buy. No negotiations with the Tennessee company have been reported as yet.

While either line is adaptable to natural gas conversion, it is thought by some oil men that the 20-in. line, due to its Gulf Coast connections and its availability for either product or crude oil service, might best be retained by the oil industry.

Conversion of the western end of the "Big Inch" would mean that the section between West Virginia and the East Coast would lie idle. It might be used, however, to send oil inland to the Great Lakes region from the Atlantic coast when tanker shipments are resumed. In fact, there is some thought that both lines should be retained by the oil industry in order to facilitate oil shipments inland from both the Gulf Coast and Atlantic seaboard terminals.

One mid-continent spokesman has asserted that the conversion of one of the lines to gas would save 200,000 tons of steel, which might better serve the industry as oil-well casing.

Meanwhile, it appears that Tennessee Gas & Transmission Co. is going ahead with its 24-in. project to make certain that the East will suffer no gas shortage next winter.

What Women Want

An ever-changing, fascinating topic of perpetual confusion to man and industry.

In the current *Butane-Propane News* F. X. Mettenett, vice president of the Peoples Gas Light & Coke Co. in Chicago, discloses that 53% of the Illinois housewives want their new range to have a medium or a high oven. William Potter of Elizabethtown, N. J., in conducting a similar survey, found the preference figures to be in the same proportion.

Now we read of a survey reported in the *Wall Street Journal* where housewives, offered a choice between table-top and a high-oven type, chose the table-top, 3 to 1.

Other disclosures: Only 5% of American families now have electric ranges; whereas over two-thirds of the consumers polled now use gas ranges for cooking, almost as many indicated they would switch to an electric range when the market opens up again.

Ceramic Range

Last month the *Wall Street Journal* tipped us off to the range of the future, a ceramic cooking appliance to be ready for the market early this year (*GAS*, Dec., 1943, p. 13). *Business Week* for Dec. 25 has now expanded our knowledge of this product.

The new range, the Agamatic, is to be produced and marketed by the Agamatic Range Corp., Summit, N. J. It

is no Victory model and does not expect to give way to orthodox stove materials when the restrictions are lifted. The appliance burns chestnut, anthracite, or peat coke. And prices are expected to be lower than those of all-metal stoves. Features are:

1. Rock wool insulation of firebox, ovens, and other working components.
2. Fuel consumption, about 10 lb. per day.
3. One of its circular, cast iron hot plates can be heated to 725° F.; the other, a simmering plate, has a 460° F. top temperature.
4. Metal used in construction amounts to about 80 lb., or about 10% of total weight.
5. The top oven heats to 500° F.; the lower one to 240° F.
6. Durability, it will last practically forever.

Design of the stove stems from Europe, and credit for its design goes to (1) Agamatic Range Corp.; (2) the Clay Products Section of WPB's Building Materials Division, which sought means of conserving metals; (3) the Ohio State University Research Foundation, which conducted basic ceramic research; (4) Office of Production Research and Development, which was responsible for the research contract; and (5) the National Bureau of Standards, which handled the performance testing.

Air Conditioning's Future

The future of air conditioning seems assured. Undoubtedly the gas utility industry will play a major role in its expansion and development. And opportunities may come sooner than we think. Technological innovations created by war are speeding up the rate of plant obsolescence, making new construction and equipment necessary.

On the domestic side, a consumer poll indicates that there will be a heavy demand for air conditioning equipment by the citizenry anxious to escape from summer's sweltering humidity. Two-thirds of those polled expressed a desire for such air conditioning equipment, if it could be installed for less than $200 per room. A desire for air moistening equipment for winter use was expressed by more than 50%.

Lone Star Complies

With the sale of its Galveston and El Paso properties (*GAS*, Nov., 1943, p. 40), Lone Star Gas Co. becomes the first major holding company system to comply fully with the geographic integration and corporate simplification provisions of the holding company act. Lone Star is one of nearly 100 companies in the process of complying with the provisions of the act.

NOW'S THE TIME!

to Stock up on . . .

DRESSER

Ready-Pack

SLEEVES

WE urge you not to delay in ordering Style 80 Dresser Ready-Pack Sleeves for your winter requirements.

At present we have an adequate inventory of these handy and popular Sleeves and can ship promptly in most cases. Tomorrow? Well, repairs can't wait! So estimate your needs —and be ready.

Other Dresser Sleeves are available for practically all other sizes and types of pipe or pipe joints. *Order now!*

STYLE 80—ONE-MAN REPAIR

Shipped completely assembled

5 to 10 minutes to install

Fits off-size pipe

Only tool—a wrench

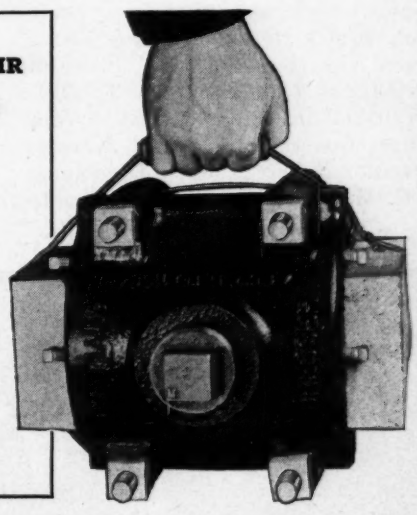
Bad weather, small space no handicap

Permanently tight

34% to 40% lower in cost

Flexible —absorbs harmful stresses

SIZES: 3", 4", 6", 8" CIP



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BRADFORD, PENNSYLVANIA

ASSOCIATIONS

Nation's Fuel Reserves

Discussed at Compact Wichita Meeting

By O. D. HALL

GAS Staff Representative

E. G. Dahlgren, Oklahoma, re-elected technical secretary; Dan O. Howard, Oklahoma, retiring chairman; L. B. Taylor, Kansas, elected chairman, all of the Research and Coordinating Committee.

RECENT accomplishments in conservation and production of oil and gas through state regulatory measures, dual completions and cooperative reservoir control, were among important subjects reviewed at the winter meeting of the Interstate Oil Compact Commission, Dec. 10 and 11, in the Broadview Hotel, Wichita, Kan. The spring meeting will be held in March, 1944, in New Orleans, La., exact dates to be fixed by the executive committee. Attendance reached about 150.

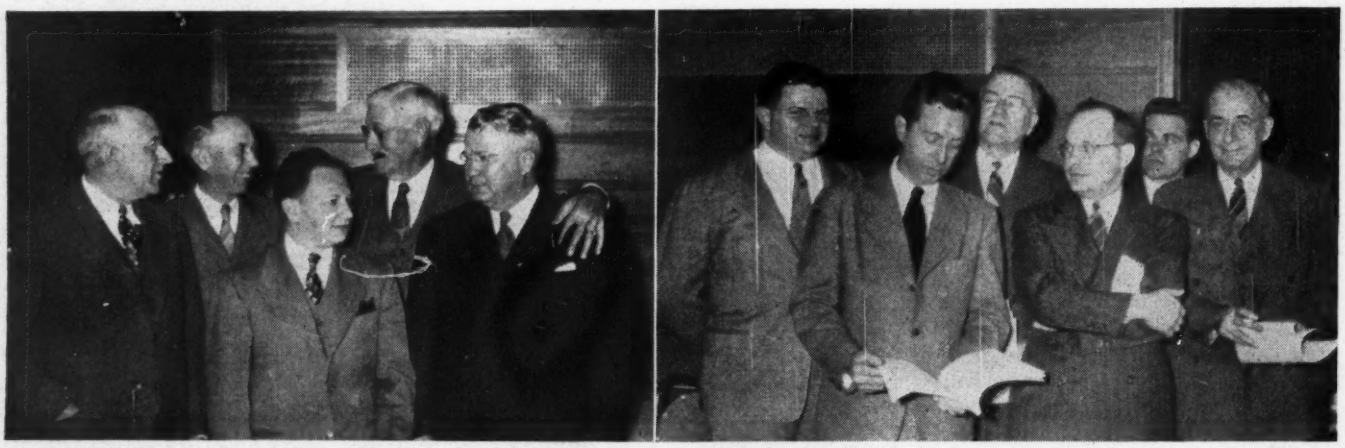
Officers elected include: chairman, Andrew F. Schoeppel, governor of Kansas, re-elected; first vice chairman, J. C. Hunter, Abilene, Tex.; second vice chairman, S. F. Peterson, Springfield, Ill.; secretary, Charles L. Orr, Oklahoma City. Executive committee; Governor Schoeppel, Kansas; Governor Robert S. Kerr, Oklahoma; J. C. Hunter, Texas; Joseph L. McHugh, Louisiana, and Hiram M. Dow, New Mexico.

The Research and Coordinating and Legal and Regulatory Practices Committees met Friday morning. The Research and Coordinating Committee also held a session Thursday night. The committee unanimously recommended election of L. B. Taylor of Kansas as chairman, succeeding Dan O. Howard of Oklahoma; Dr. S. T. Yuster of Pennsylvania as vice chairman; E. G. Dahlgren as technical secretary, and J. B. Wilson as assistant technical secretary, both of Oklahoma City. The Compact Commission, in its general business meeting, confirmed these selections.

That an initial saving of $250,000 and 6700 tons of steel were effected by the first 37 dually completed oil and gas wells in Arkansas was reported to the Research and Coordinating Committee in a paper presented by L. L. Jordan and Alec M. Crowell, engineers of the Arkansas Oil and Gas Commission. "These dual completions, as of Dec. 1, 1943, account for an average monthly production of 200,000 bbl. of high gravity crude oil and condensate and over two billion ft. of natural gas, all pledged to the war effort," the paper stated.

The engineers reported that concurrent production from two productive zones through a single well has only recently become mechanically acceptable.

The Research and Coordinating Committee reported that during the two years of its activities it has made surveys by states of secondary recovery, pressure maintenance, natural gas, stripper wells, natural gas underground storage projects, and administration of oil and gas conservation



AT LEFT (front row, left to right): Joseph L. McHugh, Louisiana; Jack K. Baumel, Texas; V. E. Cottingham, Texas. (Back row, left to right): F. M. Van Tuyl, Colorado; W. H. (Bill) McFadden, Texas. AT RIGHT (front row, left to right): Walker T. Pound, Oklahoma; Millard K. Neptune, Washington, D. C.; A. A. Hammer, Dallas, Texas. Back row, left to right): Lawrence R. Alley, Oklahoma City; S. F. Peterson, Illinois, second vice chairman; J. B. Wilson, Oklahoma City, assistant technical secretary.

laws. The conservation laws study was presented at the Wichita meeting. The project began originally as a question-and-answer symposium with 29 questions. This was followed by preparation of a paper by each member of the committee covering the history as well as the administration of the oil and gas laws for the states of Arkansas, Colorado, Illinois, Kentucky, Louisiana, Michigan, New Mexico, Oklahoma, Pennsylvania and Texas.

Cooperative reservoir control in the K-M-A pool of Wichita and Archer counties, Texas, has saved 20,000,000 bbl. of oil to date, reported William H. Rouzer, Jr., engineer, K-M-A Pressure Maintenance Association, in a paper delivered before the general session. Waivers were obtained from the royalty owners so that the gas could be returned to the leases without a title charge for gas produced by one lease and returned to another. Expense of compressing the gas returned to a unit was distributed among the operators within the unit on the basis of number of wells each operator owned within the unit. Cost of the compressing equipment and distribution system was shared by operators of the plants. The speaker reported that over 3½ million dollars are invested in the gasoline plants and the gas return system and that 102 gas input wells are in use in the field, representing an additional 2 million dollars in expenditures. All this was accomplished on a voluntary basis among operators with approval and cooperation of state conservation officials.

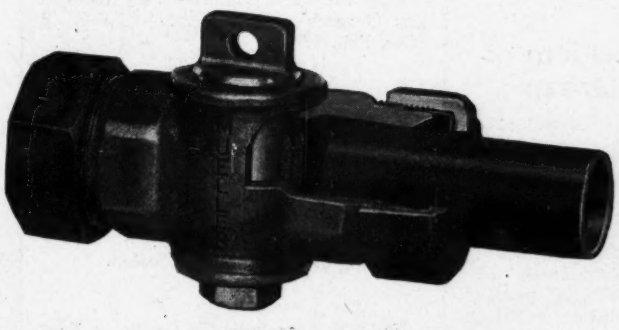
Accomplishments of cooperative engineering committees in the North Basin, Conroe, Yates, Judkins and Goldsmith pools of Texas and Lea county pool of New Mexico, were outlined in a paper by V. E. Cottingham, Midland, Tex., chairman of the engineering committee for the North Basin pools. The Conroe field, of Montgomery county, Texas, largest of all Gulf Coast fields and ranking high in the nation, was cited by the speaker as an outstanding example of successful conservation of oil and gas through cooperation between operators, engineering committees and state conservation officers. Costs for 11 months of 1943 averaged 1.96 mills per barrel. Report of the Resolutions Committee, presented by J. L. Hunter and adopted by the meeting, commended the report of the United States Bureau of Mines on the "History of Water Flooding of Oil Sands in Oklahoma." The report was completed in Nov., 1943, and was prepared by D. B. Taliaferro, petroleum engineer of the Bureau at Bartlesville, Okla., and by David M. Logan, senior petroleum production specialist, PAW, Tulsa, Okla. Copies of the 182-page report were made available at the meeting. The resolutions also commended the work being done by engineering committees and associations of oil men as outlined in the papers of William H. Rouzer, Jr., and V. E. Cottingham.

In connection with the report Mr. Hunter expressed the hope that the Interstate Oil Compact Commission will promote cooperative efforts to make sure that never again in wartime or in peace years will there be another shortage of oil and gasoline like the present one. He said that, although oil men should be encouraged to wildcat in this country, our nationals should also be encouraged to explore for oil and gas in foreign lands. In no event should the United States Government be a participating owner in any of this foreign oil and gas, he warned.

During discussions of the resolutions, P. J. Hoffmaster of Michigan expressed the wish that the commission make a further investigation of

BE PREPARED

HAVE A SUPPLY OF THESE STOPS ON HAND



MUELLER H-11400 Gas Stop with Dresser Style 90 Super Service Couplings. (Made under license with Dresser Mfg. Co.)

For a quick installation nothing equals these stops . . . No threads to cut . . . Just saw pipe to approximate length, slip on stop, and tighten nuts . . . The Dresser Compression ends grip the pipe securely, yet the rubber gaskets allow for expansion and contraction, strain, shocks, ground settlement, or shifting of pipes. Eliminates need for unions. — Leak-proof and safe! — The body is of close-grained gray iron, and the heavy red brass key, washer and nut are of high copper content. The key is precision ground into the body insuring a leak-proof seat that is easy to operate under any condition. After assembly, each stop is tested on high air pressure while submerged in liquid, and then dipped in a rust-proofing solution . . . For full information and prices write Dept. G-2

Los Angeles, Calif. MUELLER CO. Decatur, Ill.

FRONT ROW (left to right): Percy J. Hoffmaster, Michigan; Warwick M. Downing, Colorado; Governor Andrew F. Schoeppel, Kansas, re-elected chairman; J. C. Hunter, Texas, re-elected first vice chairman. BACK ROW (left to right): Ray O. Weems, Oklahoma; Charles H. Jones, Ohio; Hiram M. Dow, New Mexico; Charles L. Orr, Oklahoma, re-elected secretary.

reports that "billions of cubic feet of natural gas are going into the air" in the United States. He said he would like to see further studies on methods of conservation and utilization of such gas.

Judge Warwick M. Downing of Colorado, reporting for the Public Lands Committee, said that closer cooperation between the Department of the Interior and the oil and gas industry has been developed through recent conferences, in connection with drilling on public lands of the West. He called attention to the slowness in developing public lands for oil and gas as compared with the drilling of 21,000 wildcat wells on private lands in other parts of the United States.

L. L. Jordan, of Arkansas; F. M. Van Tuyl, Colorado; S. F. Peterson, Illinois; L. B. Taylor, Kansas; P. J. Hoffmaster, Michigan; Hiram M. Dow, New Mexico; Jack K. Baumel, Texas; Charles H. Jones, Ohio, and Ray O. Weems, Oklahoma, submitted verbal reports on accomplishments of their states as members of the Interstate Oil Compact Commission.

■ ■

Mid-West Association Meets

The Third Regional Get-Together meeting of the Mid-West Gas Association will be held at the Fontenelle Hotel, Omaha, Neb., on Jan. 20. The program will include general open forum discussion and luncheon round table meetings dealing with the following subjects:

1. Sales—domestic and industrial gas and appliance problems, current and post-war.
2. Technical—production, distribution and service problems, current and post-war.

M. K. Wrench and Joe E. Walsh will be in charge of the meeting.

Gas Measurement Course to Resume Meetings in June

The Southwestern Gas Measurement Course, temporarily suspended last year because of war conditions, will be resumed on June 6, 7 and 8, 1944. As in former years, it will be held in the main building of the College of Engineering on the campus of the University of Oklahoma.

The general committee will meet in January at Oklahoma City to consider a tentative program to be submitted by Earl Kightlinger, chairman of the program committee.

The 1944 short course will not only serve its regular purpose of bringing to personnel of gas companies engaged in various phases of gas measurement work the latest information, experiences and advancements in this field, but also will take on a war aspect. Members of the armed services who are charged with the responsibility of gas measurement and distribution at their various stations will be issued special invitations to attend the 1944 short course.

■ ■

Joullian Elected President of Oklahoma Utilities Group

E. C. Joullian, president, Consolidated Gas Utilities Corp. of Oklahoma City, was elected president of the Oklahoma Utilities Association at a directors' meeting in Tulsa, Okla., Dec. 17.

Other officers who will serve during the coming year are: George McLean, Oklahoma City, vice president; A. F. Potter, Bartlesville, second vice president; D. S. Kennedy, Oklahoma City, treasurer, and Miss Kate A. Niblack, Oklahoma City, secretary.

Directors are: A. F. Potter, Bartlesville; W. O. Smith, Ada; J. P. Arnold, Tulsa; J. C. Happenny, Sand Springs, retiring association president; E. C. Joullian, R. K. Lane, Tulsa; Glenn C. Kiley and George A. Davis, both of Oklahoma City; Frank B. Long, Tulsa; S. I. McElhoes, Chickasha, and W. L. Woodward, Alva.

Indoor Climate Institute Report of Progress

Reports presented at the December meeting of the board of directors of the Indoor Climate Institute indicated that favorable progress has been made in the organization of the institute.

"Evidence is being received from all over America that the ICI's program of education is needed and timely," said Paul B. Zimmerman, president. (GAS, Dec., 1943, p. 43.)

T. A. Crawford, general sales manager of Timken Silent Automatic Division and chairman of the Membership Committee of ICI, reported that response to the invitational brochures sent out to prospective members has been gratifying, and that the trade press, in particular, has indicated great interest in the ICI program.

C. T. Burg, general sales manager of Iron Fireman Manufacturing Co., and chairman of ICI's Public Relations Committee, outlined briefly the proposed policies and projects of his committee, commenting particularly on the ICI booklet, "Build Indoor Comfort Into Your Postwar Home," to be distributed among prospective home builders or remodelers and the institute's proposed manual or primer for the building trade.

Reports were also made on the ICI Speakers' Bureau, to be set up in order to provide qualified speakers for conventions and meetings of every branch of the allied industries; and on the membership and proposed work program of the Technical Committee, L. N. Hunter, vice president of National Radiator Co., chairman; and J. R. Scott, Mueller Furnace Co., vice chairman.

Calendar

January

Mid-West Gas Association, Third Regional Get-Together — Fontenelle Hotel, Omaha, Neb., Jan. 20.

Indoor Climate Institute, Board of Directors—New York City, Jan. 31-Feb. 1-2.

American Society of Heating & Ventilating Engineers—New York City, Jan. 31-Feb. 1-2.

February

AGA Technical Conference on Domestic Gas Reserch — Statler Hotel, Cleveland, Ohio, Feb. 17-18.

March

Southern Gas Association Convention—Roosevelt Hotel, New Orleans, La., March 22-23.

AGA War Conference on Industrial and Commercial Gas—Hotel Seneca, Rochester, N. Y., March 30-31.

NEGA Annual Meeting—Boston.

April

National Association of Corrosion Engineers—Rice Hotel, Houston, Texas, April 10-11-12.

Missouri Association of Public Utilities—Jefferson Hotel, St. Louis, Mo., April 19-20.

June

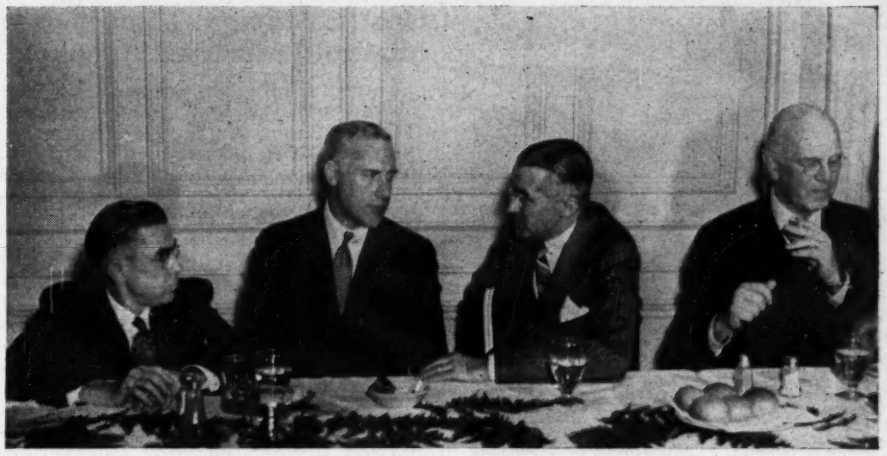
Southwestern Gas Measurement Short Course—University of Oklahoma, June 6-7-8.

Industrial War Conference Scheduled for March 30, 31

Charles G. Young, chairman of the Industrial and Commercial Gas Section, has announced that the 1944 American Gas Association War Conference on Industrial and Commercial Gas will be held at Hotel Seneca, Rochester, N. Y., Thursday and Friday, March 30 and 31. This conference, held last spring in Detroit, is the year's outstanding gathering of industrial and commercial gas men and equipment manufacturers.

The subjects of discussion will include the problems which industrial gas men have had to deal with because of the war — problems arising from the application of industrial gas to the higher speed, higher quality and greater quantity production in war plants, and those created by the operation of commercial cooking and baking equipment under the strains imposed by the war-time management of public eating places. Post-war plans as they are developing in the industrial and commercial gas fields, and problems concerning natural, manufactured and mixed gases will constitute important parts of the program.

Ivar Lundgaard, manager of industrial and commercial gas operations in Rochester, has been appointed by Mr. Young to head up the program committee. All members of the managing committee of the Industrial and Commercial Gas Section are now reviewing subjects and features for the conference. Their recommendations will be the basis for the final program, which will be prepared by Mr. Lundgaard's committee.



Snapped in luncheon conference at the organizational meeting of AGA's Technical Section (left to right): **C. F. Turner,** Technical Section chairman, East Ohio Gas Co., Cleveland; AGA President **E. R. Acker,** Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y.; **J. V. Postles,** chairman, Post-War Planning Cooperative Committee, Philadelphia Gas Works Co.; former Technical Section Chairman **F. M. Goodwin,** Boston, Mass. Camera: **A. Gordon King,** Technical Section secretary.

AGA Creates Committee To Coordinate Research

The executive board of the American Gas Association has authorized the creation of a committee on coordination of research to be appointed by the president and to include the chairman of AGA research committees. The action was taken upon recommendation of the committee on organizational changes.

The committee will maintain a constant review of all association research and make recommendations to the executive board regarding all research work undertakings. It will also make recommendation to the finance and control committee on the relative importance of research items prior to preparation of the annual budget estimate.

Departments and sections of the association will be requested to contribute to the work of this committee.

Although principally engaged in war production, Utility is in a position to supply gas-fired heating equipment, fans, blowers and coolers. Mass production of the complete line will be resumed after the war.

Peace-Time Manufacturer of the Famous Utility Air Koolers, Blowers, Fans, Floor Furnaces, Circulating Heaters, Unit Heaters, and Forced Air Furnaces.

UTILITY FAN CORPORATION

4851 South Alameda, Los Angeles 11, California

"CONSERVE ALL FUELS"

THE ABOVE illustration and headline typify a series of advertisements sponsored by the P.C.G.A. in western trade journals. The Association is also publishing full-page conservation messages in domestic magazines.

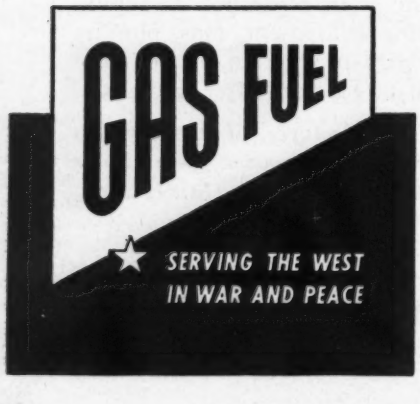
NO ACTUAL SHORTAGE HERE

At Government request, we thus inform the public that *all* fuels and utility services, including gas, must be conserved for Victory. But we also point out that the *supply* of gas in the Pacific West is *ample;* and that only lack of men and materials prevents expansion of facilities to meet unprecedented demand.

"VOICE" OF OUR INDUSTRY

On such timely topics, the P.C.G.A. speaks for all member gas companies . . . in regional publications of general circulation . . . under the direction of the Cooperative Advertising Committee.

THE PACIFIC COAST
GAS ASSOCIATION



Gas Advantages Discussed at Mineral Industries Meeting

Natural gas possesses some decided advantages as a fuel in burning lime, Homer Dunlap, Jr., St. Clair Lime Co., Oklahoma City, pointed out in a paper, "The Present Situation and Post-War Outlook of the Lime Industry," delivered before the Oklahoma Mineral Industries Conference at Tulsa, Okla., Dec. 2. A shortage of natural gas in some localities of the southeast and the middle west, however, was among some of the handicaps the industry has encountered because of war conditions. "Natural gas is the best fuel to use in burning lime because it is flexible," said Mr. Dunlap. "Plants can be operated more efficiently and with 50% greater capacity than if other type kilns and fuel are used."

Other difficulties encountered include a shortage of labor for plant and quarry work and a substantial reduction in the price of quick lime since 1930, with increased labor costs. In spite of these, however, Mr. Dunlap revealed that the lime industry in the United States has met successfully, without adding new plants, the unprecedented demand for enormous quantities of chemical lime since Pearl Harbor.

About 100 delegates representing the chemical, mining and metallurgical industries of Oklahoma attended the conference, including a number of representatives of gas companies. A natural gas man, Richard W. Camp of Oklahoma City, was placed on the board of directors. Other officers included Homer Dunlap, Jr., of Oklahoma City, president, and Robert H. Dott, director, Oklahoma Geological Survey, Norman, reelected secretary.

■ ■

PCGA Plans Conference Meetings for 1944

The section chairmen of the PCGA have scheduled their "special subject" small conferences for 1944. Because the meetings have been found more productive when the attendance has been kept small, each meeting will be an invitational one.

General chairmen of these special conferences are Harry McGann, Pacific Gas & Electric Co., accounting; R. J. Phillips, San Diego Gas & Electric Co., sales; Elting Henderson, Southern California Gas Co., technical; R. R. Blackburn, Southern California Gas Co., personnel, and H. L. Masser, Southern California Gas Co., industrial development. The meetings are scheduled during the months of January through June.

■ ■

National Association of Corrosion Engineers Formed

F. J. McElhatton, publicity chairman, has recently announced the formation of the National Association of Corrosion Engineers.

The first annual meeting is to be held April 10, 11 and 12, 1944, at the Rice Hotel, Houston, Texas. All members or applicants for membership are invited to attend.

In 1938 an organization known as the Mid-Continent Cathodic Protection Association was formed for the primary purpose of exchanging information regarding developments in the field of mitigation or prevention, by electrical means, of corrosion to pipe line and other metallic structures. After 1940 the members of this organization carried on their activities as the cathodic section of the Petroleum Industry Electrical Association. It is this latter group which is forming the new organization, to be known as the National Association of Corrosion Engineers.

All persons engaged in the work of corrosion control or mitigation on underground metallic structures are invited to apply for membership. Inquiries should be addressed to: (1) O. C. Mudd, acting secretary-treasurer, c/o Shell Pipe Line Corp., Box 2648, Houston 1, Tex., or (2) R. A. Brannon, acting president, c/o Humble Pipe Line Co., Drawer 2220, Houston 1, Tex.

■ ■

First Domestic Research Meeting to Be in February

Everett J. Boothby, chairman, Committee on Domestic Gas Research of the AGA, announces a meeting of the first American Gas Association Technical Conference on Domestic Gas Research, in Cleveland, Ohio, on Feb. 17 and 18. The purpose of the conference is the presentation and analysis of both published and unpublished fundamental research, looking toward the production of better gas appliances in the future.

Invitations to the conference will be issued to the technical men of organizations manufacturing gas appliances and related equipment, to the officials of these companies, and to interested technical men from gas utilities. Thus designers and other technicians will have an opportunity to learn what has been done and is now being done in combustion, heat distribution, ignition, venting, heat losses, speed, and related subjects in the AGA Laboratories.

In order that West Coast manufacturers and utility engineers may be able to take full advantage of the fundamental domestic gas research that the AGA has carried on, the Research Conference will be repeated on the Pacific Coast soon after the conference in Cleveland, at a time and place to be announced.

■ ■

New Spokane Franchise Permits Natural Gas Use

A franchise has been granted by the Spokane city council to the Spokane Gas & Fuel Co. for the piping into Spokane of natural gas, and it is understood that this may be done as a postwar project.

The 25-year franchise is subject to revocation by the city 10 years from July 7, 1945, the effective date, if the company fails to bring in the natural gas by that time.

F. A. Woodworth, manager of the gas company, said the natural gas would be a great industrial asset to Spokane, and that it could be piped from the Montana area with the line not more than 300 miles in length.

■ ■

Army Praises Laboratories

The American Gas Association Laboratories last month in a letter signed by Lieut.-Col. W. Randolph Lovelace II, chief of the Aero Medical Laboratory, received the commendation and thanks of the Army Air Forces Materiel Command for a series of oxygen controls developed at the laboratory under the direction of R. M. Conner.

PCGA Assigns Post-War Studies

ASSIGNMENTS for studies growing out of the recommendations of the PCGA's Committee for Industry Development, under the chairmanship of H. L. Masser, executive vice president, Southern California Gas Co., Los Angeles, have been made as follows:

The sales and advertising section, R. J. Phillips, chairman, is to study the post-war market based on records of the past, taking into account new developments such as west coast population gains, possible industrialization, housing needs and characteristics and probable competitive conditions.

The Post-war Appliance Committee, W. M. Jacobs, chairman, will continue its study of appliance improvement. At a meeting of this committee on December 8, two subcommittees were formed. The first, headed by Frank Weiss, Southern California Gas Co., will investigate the possibilities of new appliances such as dishwashers, incinerators, etc., and the second headed by E. H. Adler, San Diego Gas and Electric Co., will devote itself to commercial and industrial appliances. The Post-war Appliance Committee late in November mailed to all Pacific coast manufacturers a comprehensive outline of possible fields for research in the development of domestic gas appliances. Copies of this outline have been requested by AGAEM for distribution nationally.

The study of post-war sales policies, including advertising and sales financing, was assigned to a special subcommittee headed by O. R. Doerr, Pacific Gas and Electric Co. The possibility of more uniformity in utility sales and service policies will be considered as an aid to manufacturers and distributors.

To the Technical Section, Elting Henderson, chairman, was assigned an investigation of new materials, of construction, training of service and operating personnel and a study of the Pacific coast gas supply situation, both natural and manufactured.

W. G. Vincent, Pacific Gas and Electric Co., a member of the main committee, has undertaken a study of national economic factors as they may affect the post-war gas business on the coast. Among these are manpower and employment possibilities. In this Mr. Vincent has asked R. R. Blackburn, Southern California Gas Co., to enlist the aid of Pacific coast personnel men and as a result Mr. Blackburn has called a personnel meeting to be held in San Francisco on January 19 and 20.

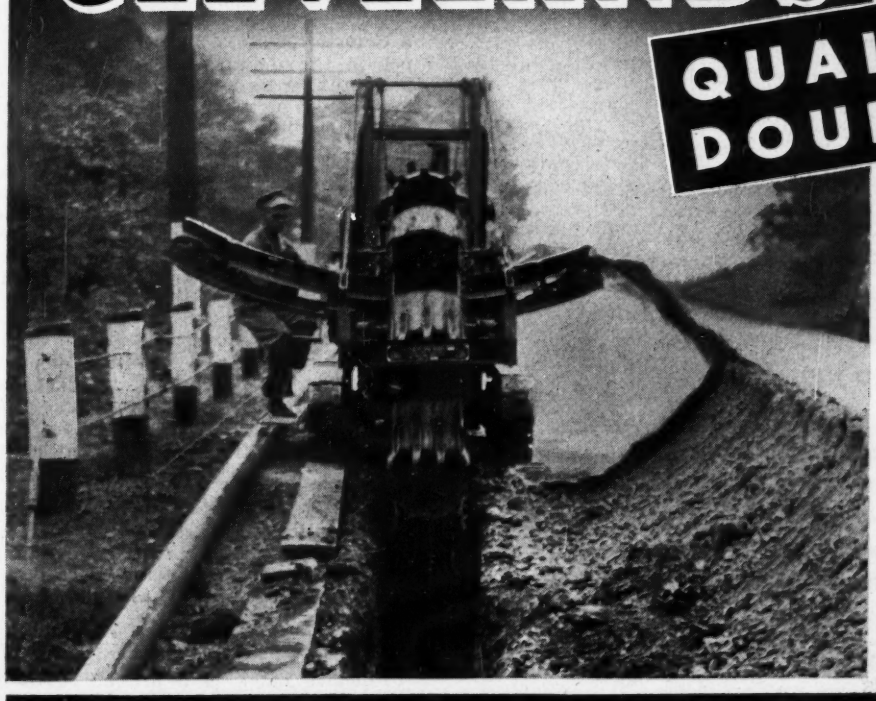
The Manufacturers Section, A. H. Sutton, chairman, will work closely with all of these projects, particularly in furnishing statistical material and in advising on appliance production possibilities.

■ ■

New Gas Production

• Natural gas is reported to have been discovered in the central section of the Canadian province of Saskatchewan. A report from the Provincial Department of Natural Resources, issued Dec. 2, said the discovery was made by the Simpson Oil and Gas Co., Ltd., drilling between the communities of Simpson and Imperial. The company sunk three wells in the section, striking gas in the No. 3 well at 600 ft. with pressure at that depth recorded at 259 lb. The department report stated that the gas was mixed with water, and that the drilling crew would seek to effect a water shutoff with the intention of sinking the well deeper. The Simpson Oil Co. has for some time been conducting explorations for oil and gas in the district, about 100 miles northwest of Regina. In all, the company has sunk 25 shallow test wells after receiving the report of a survey conducted by Prof. F. H. Edmunds of the University of Saskatchewan.

"CLEVELANDS"



QUALIFIED for DOUBLE DUTY—

1 WAR EMERGENCY SERVICE FOR UNCLE SAM or

2 DIGGING TRENCH FOR CIVILIAN REQUIREMENTS

• Correct, compact design—Multi-speed Transmission—Abundant Power Full Crawler Mounting—High Capacity Digging Wheel—Operating ease—Unit type construction and Top Quality Materials—features that have made "CLEVELANDS" preferred equipment for Gas Companies for close to a quarter of a century—are some of the reasons why Uncle Sam's Engineers found in "CLEVELANDS" the built-in adaptability to meet the tough conditions in the various war theaters and why "CLEVELANDS" are today valuable adjuncts to our combat forces.

THE CLEVELAND TRENCHER COMPANY

20100 ST. CLAIR AVE. "Pioneer of the Small Trencher" CLEVELAND 17, OHIO

"CLEVELANDS" Save More . . . Because they Do More

Bulletin on Automotive Cooling System

A comprehensive treatise of automotive cooling systems, the bulletin recently issued by the Office of Defense Transportation, *Cooling Systems: Cleaning, Flushing, Rust Prevention and Antifreeze*, is available from the Vehicle Maintenance Section, Division of Motor Transport, Washington. In discussing the importance of preventive cooling system maintenance, the bulletin states:

"Every commercial vehicle operator should carefully restudy his cooling-system maintenance methods, particularly in the light of present war emergency conditions of discontinuance of motor vehicle production for civilian use, shortage of replacement parts and labor, and increasing demand on existing vehicles for essential services connected with the war effort.

Preventive cooling-system maintenance service, in the real sense of the word, should be practiced. For example, overheating of the engine from loss of cooling liquid should be avoided by *preventive* inspection and servicing for leakage and overflow losses rather than by continually adding water or valuable antifreeze. Likewise, the problem of rust-clogging and corrosion damage should be eliminated by the *prevention* of corrosion rather than by the correction of rust-clogging through clean-out methods or the replacement of damaged parts containing critical materials after the cooling system is in trouble.

"Generally speaking, preventive cooling-system maintenance never has been up to the standard of service for other units of the vehicle. It is therefore all the more important that a higher standard should be set and constantly maintained during these critical times to prevent conditions of neglect that otherwise will result in gasoline wastage, lubricating difficulties, and excessive wear or damage of the engine from either overheating or overcooling.

"The importance of maintaining the automotive cooling system as close as possible to new-car efficiency at all times can be appreciated if it is realized that even in the smaller engines the amount of heat which must be dissipated through the cooling liquid and radiator is sufficient to heat a 6-room house on a zero day. The amount of water pumped at high speed in such an engine would fill a 50-gal. drum in 60 sec. Complete failure of cooling for any reason means dangerous overheating of the engine in a few minutes.

"Proper cooling contributes more to continued engine operation and long life than is generally realized. Many expensive road failures are caused by the simplest irregularities that very often could have been detected and corrected through a few minutes' close inspection before the vehicle left the shop."

Other sections of the bulletin of interest to the industry include preventive inspection and testing for cooling liquid losses; routine maintenance of the cooling system; diagnosis of overheating and over-cooling of engine; cooling system corrosion and its prevention, and physical and chemical characteristics of different types of antifreeze and their effects on the cooling system.

■ ■

Washington Orders

Manufactured Gas (L-174): Schedule A of the order, listing industrial and public consumers who must receive preferential attention from utilities, was revised to bring it into accord with the schedule contained in U-7 pertaining to natural gas.

General directive No. 1 of L-174 was revoked, placing consumers with standby on an equal basis during curtailments. Formerly, deliveries were first reduced to those with coal burning standby equipment.

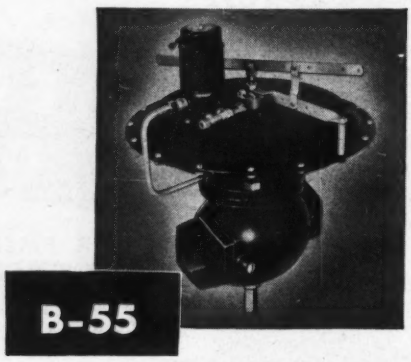
• **Copper (M-9-c):** Restricts use of copper in the manufacture of articles or parts (or repair parts) where less scarce material is available. Where copper is permitted, minimum amounts must be used. Principal gas industry items affected are: heaters, air conditioning equipment, hot water tanks, piping and tubing, unit heaters, gas heater and stove installation connections, ranges (except when in specified uses where ½ to 1½ oz. of copper base alloy is allowed).

• **Gas and Electric Utilities (U-1-f):** An amendment issued in December removes the restriction limiting short line extensions to consumers previously unable to obtain service. Persons living outside critical housing areas will now be able to have service.

• **Natural Gas:** Sweet natural gas, without liquid hydrocarbon fractions extracted, produced in Hugoton Field, Okla., and when sold for use in the manufacture of furnace black, was given a ceiling price of 4 cents per thousand cu. ft., at a pressure of 16.4 lb. per sq. in., by OPA Dec. 23.

Furnace black is a product used in the manufacture of synthetic rubber.

• **Repair Service:** In order to insure adequate supply of repair and maintenance service for gas appliances, OPA on Dec. 27 allowed some suppliers to increase prices.



FOR INDUSTRIAL AND COMMERCIAL BURNERS AND FURNACES

Opening time adjustable, 5 to 60 seconds. • Widest range in pressures. Handles up to 5 lbs. • Widest range of sizes. Available from ¾" to 6" I.P.S. for manufactured, natural or l.p.g. gases. • Ample power is available for louvre control. Damper arm easily rotated to any desired position. • Low current consumption. In sizes up to 1½" I.P.S., uses but 8 watts.

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Soil Corrosion Survey at Wichita Falls, Texas

According to the December, 1943, Technical News Bulletin of the National Bureau of Standards, K. H. Logan, chief of the bureau's underground corrosion section, in cooperation with the Cast Iron Pipe Research Association, is making a special survey of corrosion experienced in the vicinity of Wichita Falls, Texas, at the request of that city's water department.

The shortage of iron and steel has accentuated the need for reducing corrosion of pipelines as much as possible. The most promising method at present seem to be the imposition of negative electrical potentials on a line which is to be protected. There are two ways of doing this, one by drawing energy from a regular power line, the other by connecting to the pipeline zinc slabs buried at intervals in the earth. The first method is in widespread use in Texas, and a very extensive installation of zinc anodes has been in use in southern Colorado for a number of years.

The Petroleum Industry Electrical Association and a number of pipeline organizations have asked for cooperation in determining the effectiveness of these two field methods, and Mr. Logan will also consider this aspect of the problem.

■ ■

New Brunswick Gas Shortage

A natural gas shortage is being experienced in the Canadian city of Moncton, New Brunswick, and residents there as well as in neighboring municipalities have been warned that no improvement can be expected unless new fields are developed. The shortage has resulted despite the fact that two new wells, with a combined production of 1,350,000 cu. ft. daily, have been brought in at the Stoney Creek fields, making a total of 39 wells now producing in the province.

Countering the benefit of these new wells is the fact that several other wells have shown decreased production, while the demand for natural gas has ranged higher because of severe winter weather, with temperatures dropping as low as 30 degrees below zero on occasion. H. W. Hole, manager of New Brunswick Gas and Oil Fields, Ltd., says experts have recommended a wider program of drilling and exploration. He adds, however, that funds are not available for other than routine drilling in proven fields.

Approximately 6400 customers in and around Moncton are served by gas from the Stoney Creek fields.

■ ■

P. G. & E. Meets Peaks With Dry Gas

Activity in California's dry natural gas fields, especially those of the northern California region which have become main support of the widespread Pacific Gas & Electric Co. distributions, is reflected in the November drilling report.

For the first 11 months last year, 26 new dry gas wells, or twice as many as in the like 1942 period, were completed, while 25 new drilling rigs had been set up as against 16 in the like 1942 period.

Entering December, 144 wells were on production, which was 36 more than the year previous.

Sharp increase in wells put on the producing lists are due to be shown for December and January as seasonal gas demand mounts. The peak last January was 166 dry gas wells on production and the number is expected to go well above 200 before the end of this month.

■ ■

AGA Issues Air Conditioning Leaflet

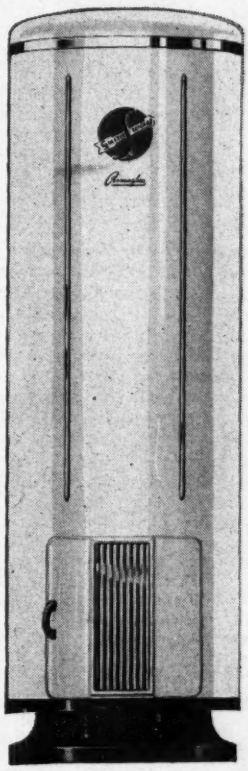
The AGA has recently published a leaflet, "Improving Installation Design and Reducing Investment Cost of Gas Air Conditioning Systems," by G. E. May, chairman, Technical Advisory Committee, Joint Committee on Gas Summer Air Conditioning of the Industrial & Commercial and Residential Sections.

The paper discusses the following factors affecting the calculations of capacity requirements: (1) heat transmission through walls, ceilings and floors; (2) sun effect; (3) electric lights and appliances; (4) persons; (5) ventilation; (6) duct losses; (7) totals—still high; and (8) load factor.

■ ■

Michigan Consolidated Buys 2 Companies

Michigan Consolidated Gas Co., exercising an option, has purchased the Big Rapids Gas Co. and Mecosta Pipe Line Co., according to an announcement made by W. C. Taggart, president of the Big Rapids and Mecosta concerns. Transaction was to have been completed by Jan. 1.



YES, the illustration shows a sample of Permaglas—the glass lining of a SMITHway Automatic Water Heater.

You knew Permaglas before the war. You'll know it better than ever when critical materials go back into civilian use.

Permaglas is your hallmark of quality—your basis for selling *profitably* in a market that will demand the highest standards possible in household convenience, sanitation, and cleanliness.

Keep SMITHway Permaglas Automatic Water Heaters at the top of your list. You'll find them a profitable source of customer satisfaction.

Permaglas *is the copyrighted name for the glass lining developed and pioneered by the A. O. Smith Corporation for steel tanks. It is corrosion-resistant, smooth, lustrous and sanitary. Its elasticity is equal to that of the steel to which it is fused.*

Heated with Gas . . . Stored in Glass

Permaglas Victory Model Heaters are available in all sizes in accordance with L-185

SMITHway Permaglas GLASS LINED WATER HEATERS

Offices at: New York · Pittsburgh · Chicago · Tulsa Houston · Los Angeles · Seattle

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PEOPLE

• **L. L. Baxter** of Fayetteville, Ark., vice president of the Arkansas Western Gas Co. since 1936, has been named president. His selection was announced following the setting up by the company of a new board of directors in compliance with an SEC order. Other members of board of directors are: **Clint Murchison,** Dallas, Texas, chairman; **John Cain,** also of Dallas; **E. W. Cook,** El Paso, Texas, and **Marion Wasson,** Fayetteville, Ark.

L. L. Baxter

Mr. Baxter came to Fayetteville from Dallas in 1932 as district manager. At the present time he is secretary-treasurer of the Southern Gas Association, in which capacity he has served since March, 1940.

• Union Gas Company of Canada, Ltd., with headquarters at Chatham, Ontario, has named **Russell M. Perkins** of Chatham to the newly created position of supervisor of customer relations with authority extending to the company's subsidiaries—City Gas Company of London (Ontario) and the Windsor (Ontario) Gas Company. The general manager, **Colonel Thomas Weir,** says that the purpose of the new job is to provide the public with the best possible service. Joining the company in 1934, Mr. Perkins has been sales manager of the Windsor Gas Company for the past two years. Prior to that he had been district sales manager at Sarnia, Ontario, for four years. He was named to the new post November 30.

• Wisconsin Power & Light Co., Madison, Wis., announces the appointment of **J. D. Howard,** commercial and industrial supervisor of the company, as its new business manager, to succeed **Paul DeLeon,** who has recently gone to Cleaver-Brooks Co., Inc., Milwaukee. Mr. Howard had recently been on leave from the company to serve with the War Production Board.

• **H. C. Thuerk,** president of Bradford Electric Co. since 1941, has been elected president and a director of New Jersey Power & Light Co., according to an announcement made Nov. 10. Before 1941 he was a member of the staff of the Atlantic Utility Service Corp., New York. He has been an active member of the AGA, serving as chairman of the Community Development Committee from 1939 to 1941.

• **C. A. Breitung,** vice president and director of Southwest Natural Gas Co., Ada, Okla., has resigned from the company to devote his full time to private business .He had been at Ada since 1927, and will now go to San Antonio, Texas.

• **James F. Pollard,** retiring president of the Seattle Gas Co., was honored Dec. 7 at a dinner attended by more than 150 employees of the company. Mr. Pollard, a past president of the Pacific Coast Gas Association and an industry leader in establishing the AGA national advertising program, will take up new business connections in California. Succeeding to the presidency of the Seattle Co. is **N. Henry Gellert** of Philadelphia. **Charles Sturkey** of Rock Hill, S. C., is the company's new vice president and general manager.

• The following changes in the management personnel of the Pacific Gas & Electric Co. have been announced by **A. Emory Wishon,** vice president and general manager: Effective Jan. 1, **Thomas J. Straub** will be general counsel; **R. H. Gerdes,** assistant general counsel; **W. B. Bosley,** special counsel; **W. G. B. Euler,** vice president in charge of operations; **I. C. Steele,** chief engineer; and **Walter Dreyer,** chief of the division of civil engineering. All except Mr. Gerdes, who comes from the law firm of Earl & Hall & Gerdes, are former members of the company.

• **F. S. Wade,** president, and **H. L. Masser,** executive vice president, Southern California Gas Co., have announced the appointment of **Dr. George Hebbard** as technical adviser to direct the manufacturing processes at the company's butadiene plant. Dr. Hebbard has been retained for a limited period of time through the cooperation of Dow Chemical Co., where he has been serving as superintendent of the Torrance styrene plant, which he was responsible for building.

Grove Lawrence will continue as manager of manufacture, compressor and storage; **J. G. Rollow** as construction engineer; and **Guy Corfield** as research chemist.

Two of the units of the butadiene plant resumed production late in December. It is expected that the remaining units will be brought into full operation within a short period.

• **President F. S. Wade** of Southern California Gas Co. has announced the following shifts of executive positions in the company, "in the interests of greater efficiency and simplification of operations": **G. W. Carbee,** former southern division manager, will become manager of purchases and stores. His old position will be filled by **P. W. Walters,** recently district agent at Compton. **William Maddock** will continue to act as purchasing agent under the direction of Mr. Carbee. Mr. Carbee will work under **Vice President William Moeller, Jr.** As a result of these changes, **C. A. Renz,** manager of customers service, will be under the supervision of **Vice Presiden F. M. Banks** instead of under **Executive Vice President H. L. Masser;** and **B. M. Laulhere,** manager of engineering services, will work under Mr. Masser rather than under Mr. Moeller.

• **H. M. Brundage,** New York regional director of the Smaller War Plants Corp., and former gas industry sales executive, has recently been appointed commissioner of markets of New York City by Mayor F. H. LaGuardia to succeed **Daniel P. Woolley, Jr.** Mr. Brundage was formerly associated with Consolidated Edison Co. of New York, Inc., Standard Oil Co. of New York, and Washington Gas Light Co., and for several years operated his own gas refrigerator distribution firm in Richmond, Va. He held various posts in the WPB before being named regional director of the Smaller War Plants Corp. last spring.

• **D. A. Hulcy,** president of Lone Star Gas Co., has recently announced the following changes among executives of the company: **Richard G. Soper,** who came to the Dallas division 35 years ago, retired as vice president of Lone Star and general manager of the Dallas division. **Chester L. May,** a vice president of the company, was promoted to have general supervision of all distribution properties of the system, including Dallas and Fort Worth. Mr. May has been with Lone Star since 1917. This change places the two principal departments of the Lone Star system under unified management, with **Elmer F. Schmidt,** vice president in charge of the gathering and transmission system and related activities, and Mr. May in charge of distribution properties.

C. L. May

• **Wesley F. Wright,** operating manager of the Dallas division under Mr. Soper, will succeed him as general manager of the division, effective Jan. 1.

Floyd L. Carmichall, operating manager of the Fort Worth division since 1933, has been appointed general manager of that division.

Roy C. Coffee, who came to the legal department of the company 18 years ago, has resigned as general attorney to resume private practice of law.

• **O. H. Moore,** formerly assistant superintendent of compressor stations for the Lone Star Gas System, resigned from that position on November 15 to become superintendent of compressor stations for the Tennessee Gas and Transmission Co., which is building the new gas line from Corpus Christi east to West Virginia.

Mr. Moore had been with the Lone Star Compressor department since 1926, and had been assistant superintendent of that department since 1929.

• **E. A. Steinberger,** chief valuation and plant accounting engineer for Lone Star Gas Co., has resigned to enter private practice as consulting valuation accountant and engineer. On Jan. 1 he opened his office in Suite 1308 Liberty Bank Bldg., Dallas, Texas.

Mr. Steinberger will specialize in all phases of valuation accounting and engineering of gas and oil properties, as well as in the derivation and study of original costs and utilization of gas utility properties as prescribed in Federal

Power Commission Order No. 73. Mr. Steinberger has been associated with Lone Star and affiliated companies for 18 years in plant accounting and valuation work.

• **Don Warner,** former manager of a number of Gas Service Co. properties at Warrensburg and Carrollton, Mo., has been chosen to succeed **Jack Torbert** as new business manager of the Gas Service Co. at Wichita, effective Jan. 1. Mr. Torbert resigned to enter private business in Kansas City, Kan. **Vern Allison,** new business manager of the company's Wichita and Carrollton group, will be promoted to take over Mr. Warner's former duties.

• The Iowa-Illinois Gas & Electric Co. has recently announced the promotion of **Margaret A. Crooks** to the position of home service director of the entire company organization, covering several Iowa and Illinois cities, and of **Wayne J. Lintz** to that of merchandise supervisor of the Illinois district. Mrs. Crooks, formerly with Marshall Field and Commonwealth Edison companies in Chicago, has been with Iowa-Illinois since 1939. Mr. Lintz came to the company more than 10 years ago.

• The Mountain Fuel Supply Co., Salt Lake City, Utah, has recently appointed **Phyllis Snow** as home service director. Miss Snow, a graduate of the University of Utah, was formerly a home economics teacher in the Salt Lake City area. The Mountain Fuel Supply Co. serves 20 Utah and three Wyoming communities.

• **Walter Ochterbeck,** field engineer for the division of distribution of the Lone Star Gas System and member of the company for 18 years, was promoted to assistant engineer November 1. His promotion was announced by **L. B. Denning, Jr.,** operating manager. In his new capacity he will work under **H. D. Portwood,** chief engineer of distribution.

• The executive board of the American Gas Association announces the reelection of the following members of the finance and control committee: **James A. Brown,** Commonwealth & Southern Corp., New York, chairman; **George S. Hawley,** president, Bridgeport, Conn.; **Frank H. Lerch, Jr.,** president, Gas Companies, Inc., New York, and **P. S. Young,** chairman of executive committee, Public Service Electric & Gas Co., Newark. N. J.

After constitutional amendments have been adopted, the two vice presidents of the association will also be members **ex officio.**

• **Margaret Woodman Andersen** has been appointed home service director of the Grand Rapids district of Michigan Consolidated Gas Co., to succeed Lucille M. Hall who resigned on December 15. Mrs. Andersen has been a member of the Grand Rapids home service staff for five years, and was recently appointed chairman of the nutrition committee of the Kent county defense council. **Lois Nelson Kalawart,** assistant director, has been assigned additional responsibilities as supervisor of the company's nutrition center.

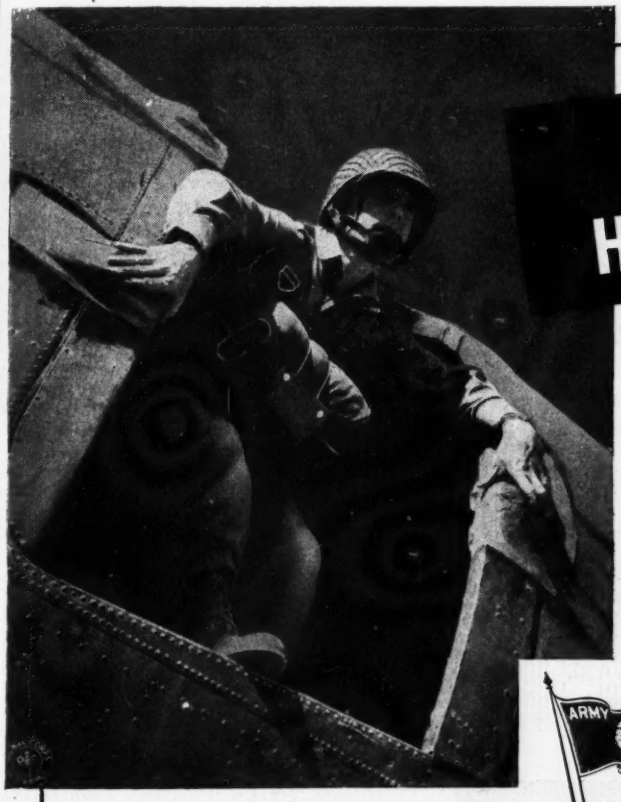
• **N. R. Feltes,** vice president of Bastian-Morley Company, Inc., La Porte, Ind., has been elected to the executive board of the American Gas Association, to succeed **Watson E. Derwent,** who recently resigned.

Mr. Feltes has been executive vice president and director of Bastian-Morley Co., Inc., since 1933. Prior to that time he had been associated with Morgan & Wright, Detroit; Losier Motor Co., Detroit; Ames Holden McCready, Montreal; Studebaker Corp., South Bend, and from 1928 to 1933 was president and director of N. R. Feltes & Co., Chicago.

He has been active in the Association of Gas Appliance and Equipment Manufacturers, and is a director of the Plumbing and Heating Industries Bureau, Chicago.

Mr. Feltes has been president of American Trust Co., South Bend, since 1935; director of Electric Spraylit Co., Sheboygan, Wis., since 1928, and director of Campbell, Wyant and Cannon Foundry Co., Muskegon, Mich., since 1942.

• **Richard Sachse,** member of the California State Railroad Commission since April, 1941, has been elected president of the commission. Mr. Sachse, consultant engineer and former chief engineer for the commission, was named by former Governor Olson to fill an unexpired term in 1941, and reappointed for a six-year term.



WOULD YOU HAVE THE NERVE?

How'd you like to "sweat it out" with the Paratroopers? . . . step off into space on a combat mission? ★ Perhaps you, and we, could do it *if we had to.* But all that Uncle Sam asks of *us* is to buy more War Bonds, sacrifice a few comforts and produce for Victory! ★ The PAYNE plant has concentrated on war production for two years. But PAYNE Gas Furnaces will be back . . . surpassing even their pre-war standards of design, quality and performance. *You can count on that.*

ARMY E NAVY

PAYNEHEAT

NEARLY 30 YEARS OF LEADERSHIP

GAS FUEL Has Everything

Payne FURNACE & SUPPLY CO., INC., BEVERLY HILLS, CALIFORNIA

PEOPLE

• **E. P. "Red" Millikan,** since 1929 manager of the Pacific Coast sales division of American Stove Co., was transferred to Chicago on Jan. 1 as manager of the company's northern sales division. **R.W. "Doc" Campbell** steps into Mr. Millikan's former position as manager of the Pacific Coast sales division.

R. W. Campbell

"Red" Millikan entered the range manufacturing industry in 1920 immediately following his graduation from university, becoming a salesman for Clark-Jewell Stove Co. on the West Coast. He was subsequently transferred to Chicago as assistant sales manager for Clark-Jewell, a division of American Stove Co., and held that position until his return to the Coast in 1929.

"Doc" Campbell has had a long career in the gas utility industry, serving as superintendent of appliance sales for Southern California Gas Co.; sales manager for Payne Furnace & Supply Co., and West Coast representative for L. J. Mueller Co. He joined American Stove 13 years ago as a salesman and served the company for a number of years as Los Angeles manager prior to his present appointment.

• Frank H. Fisher of Chicago has been appointed manager of the welding and cutting division of the Bastian-Blessing Co., Chicago. He will supervise promotional and sales work of the company's "Rego" line and work in close cooperation with customers of "Rego" welding and cutting products.

Mr. Fisher was previously associated with American Steel Foundries of Chicago, and also served for a number of years as district sales manager of R. Cooper, Jr., Inc., General Electric Co.'s Chicago distributor.

• **Harold E. Handley,** general manager of Handley Brown Heater Co. of Jackson, Mich., announces the appointment of **Harold J. Rust** as new sales manager of the company.

Mr. Rust started with Consumers Power Co. of Michigan in the Saginaw division as crew manager of water heater salesmen in 1927, was made appliance superintendent of that division in 1928, and went to Jackson in 1934 as superintendent of gas and electric appliance sales. He goes to Handley Brown from a position as director of sales of Acme Industries, Inc., Jackson.

Ralph H. Heberling, for the past two years assistant to the president in charge of manufacturing, has been appointed vice president of the Edward Valve & Mfg. Co., Inc., East Chicago, Ind., effective Jan. 1, 1944.

Mr. Heberling, who before joining the Edward organization was for many year a prominent Chicago area manufacturer and consulting engineer, will continue to supervise all manufacturing activities of the company.

• **Fred A. Kaiser** has been appointed assistant to the president of Detroit-Michigan Stove Co., it was announced by **John A. Fry,** president. Prior to his elevation to the new position he was sales manager of the company.

Fred A. Kaiser

Mr. Kaiser has been associated with Detroit-Michigan Stove for the past 10 years. Starting as a territory sales representative in Pennsylvania and New York in 1933, he later did similar work in Michigan. In 1938 he was made sales manager. During the past 16 months, most of his duties have been in connection with the company's new plant No. 2, which is entirely on war work.

• **George Baldwin,** former Washington sales representative of the Geo. D. Roper Corp., Rockford, Ill., and recently chief of the Domestic Stove Section of the Plumbing and Heating Division of the WPB, has been appointed sales manager of the Roper company's gas range division. Mr. Baldwin will devote much of his time to production and distribution of the war model gas range which Roper will start producing in the near future.

H-M
Low Pressure Regulators
Positive Control
Sizes ¾" to 2"
For absolute constant pressure even though the line pressure increases as much as one pound, H-M Pressure Regulators control gas more economically, reducing trouble calls and service expense. Send for specifications and detail data.
ALL SIZES STILL AVAILABLE
H-M REGULATOR COMPANY •
800 E. 108 ST. LOS ANGELES 2 CALIF.

Obituaries

Al C. Joy

Alexander Cartwright Joy, 63, director of public relations and head of the advertising department of Pacific Gas & Electric Co., San Francisco, died on December 4 after a short illness.

Al C. Joy

Al Joy's career was a colorful one. In 1922, after varied experience as printer, actor, reporter, dramatic critic, editor, publicity director for political campaigns and student of law, he was appointed advertising manager of the San Joaquin Light & Power Corp., and remained ever since in the public utility field. In 1930 he became publicity and advertising manager of the Pacific Gas & Electric Co.

Since 1931 he had been a member of the Pacific Coast Gas Association, serving several times as chairman of the association's cooperative advertising committee. He was in 1941-42 president of the Public Utility Advertising Association of America.

In addition, he had been president of the San Joaquin Valley Baseball League, California Raisin Festival Association, San Francisco Electric Development League, San Francisco Press Club and San Francisco Advertising Club. He was one of two men to whom San Francisco's well known club, the Family, had granted an honorary life membership.

A. E. Lindquist

Albert E. Lindquist, 50, publisher of "Gas Age" and secretary of the Robbins Publishing Co., died suddenly of a heart attack on December 5 at his home in Chappaqua, New York.

A. E. Lindquist

With the merging of "Gas Age" and "Gas Record" in 1921, Mr. Lindquist became middle western manager of the new magazine. In 1928 he was made managing editor, and since then progressed steadily to the position he held at the time of his death—publishing not only "Gas Age" but also "Industrial Gas," "Gas Appliance Merchandising," "LP-Gas" and "Brown's Directory of American Gas Companies." He had been with the Robbins Publishing Co. for 22 years.

Mr. Lindquist was clerk of the Gild of Ancient Supplers, a veteran of the last war, commander of American Legion post No. 453, and only a month ago was chosen for a two-year term as councilman of the town of New Castle.

•

Otto Goldkamp

Otto Goldkamp, 49, gas meter department superintendent for the San Diego Gas and Electric Co., died December 23, after an illness of several weeks.

Mr. Goldkamp had been with the company since 1909 as messenger, meter reader, foreman of the gas meter repair shop, and finally as superintendent of the gas meter department. His inventions in the fields of gas pressure regulation, and in the accurate measurement of gas flow, and his development of many appliances for repairing and testing of gas meters, straining devices, etc., gained for him a wide reputation in the gas industry.

Throughout his career he was active in the work of the Pacific Coast Gas Association, and in 1937 was awarded the association's Basford trophy for outstanding achievement.

•

John M. Fisher

John Manley Fisher, 51, regional manager for the Bryant Heater Co., died at St. Luke's Hospital, Cleveland, on December 14.

Mr. Fisher was a veteran of the last war, in which he attained the rank of major, and received many decorations for his accomplishments. After the war he spent several years with the Anglo-Persian Oil Co., engaged in drilling operations in Mexico, and entered the gas heating business in 1926. In 1933 he joined the Bryant Air Conditionng Corporation, Chicago, and went to Cleveland in 1939 in the position he held at the time of his death.

•

W. H. Parker

W. H. Parker, 51, vice president in charge of manufacturing, Pittsburgh Equitable Meter Co., died suddenly Dec. 28 in his Cathedral Mansions apartment home.

During World War I Mr. Parker was cited for the development of a synchronizing device for firing bullets between the blades of airplane propellers. During our present war, Mr. Parker aided in the development and manufacture of medium caliber, armor-piercing shells. He was a graduate of North Carolina State College.

•

C. H. Van Hooren

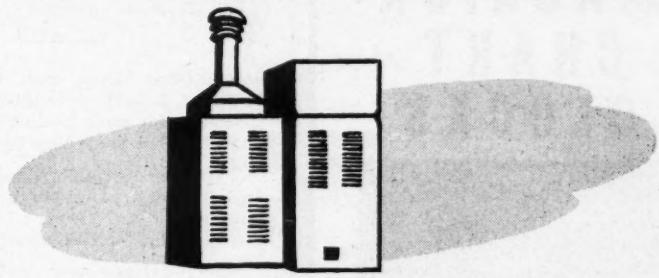
Charles H. Van Hooren, 34, chief clerk in the commercial department of Portland Gas & Coke Co., died suddenly of a heart attack on November 25. Mr. Van Hooren had been with the company for 16 years, and had been in the commercial department since 1932.

Citation to P. G. & E.

The Pacific Gas and Electric Co. has recently received official commendation from both the army and navy—in letters from Lieutenant General Delos C. Emmons and Rear Admiral John W. Greenslade—for its extensive, efficient and thorough participation in the war effort. Utility companies are not eligible for the army-navy "E," and this double citation from the military authorities may fairly be considered an equivalent honor; for, as the letters point out, the new construction and production records established in the district served by P. G. & E. were made possible by the power, light and fuel the company was instrumental in supplying.

write

YOUR OWN TICKET—



—WITH A GASAIR PLANT

Do you need gas—or more gas than you now can get during peak hours? Do you need more heat unit value? Is manufactured gas costing you too much money?

Write your own ticket with a GASAIR installation, distributing a gas mixture of butane-propane and air at the pressure and heat unit value you specify!

FOR STAND-BY USE OR PERMANENT OPERATION

Utilities and industrial plants use GASAIR-produced fuel to supplement piped gas, or replace it entirely for a few hours or permanently!

Write for Details

SERVICE AVAILABLE THROUGHOUT U. S.

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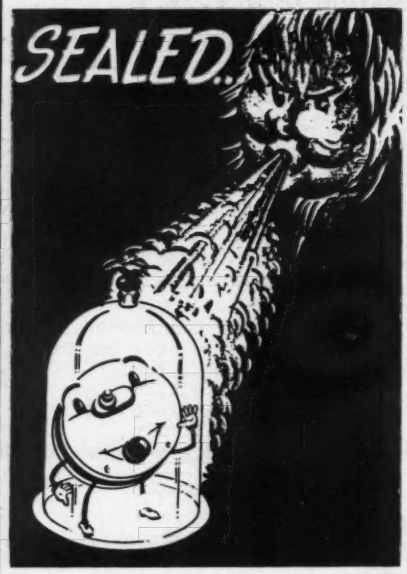
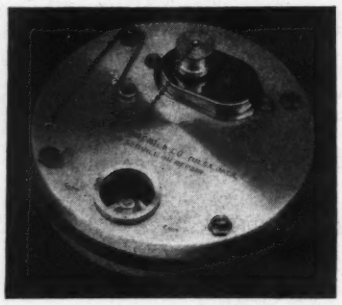


. . Safe from Winter's Icy Blasts!

MACNICK CHART CLOCKS



10 ROTATION SPEEDS

Hermetically sealed against dust, moisture, corrosive gases. This protection cuts repair costs to a point near zero and insures uninterrupted service. Macnick Clocks fit practically all instruments using circular charts, enabling you to cut your clock inventory and operate with a minimum of spare clocks. Thousands in use by major companies. Send for Bulletin 104-A.

$9.50 EACH — **For the 24-Hour Clock, Complete With Adapter and Winding Key**

Interchangeable Converter Gears to effect one turn of the chart in 2, 3, 4, 6, 8, 12 or 24 hours, or in 2, 3, or 7 days, $3.50 each. *One Macnick Chart Clock* thus gives you *10 rotation speeds.*

Send for Bulletin No. 104-A

AMERICAN RECORDING CHART CO.
3113 E. 11th St.
Los Angeles 23, Calif.
510 S. Lansing Ave., Tulsa 5, Okla.

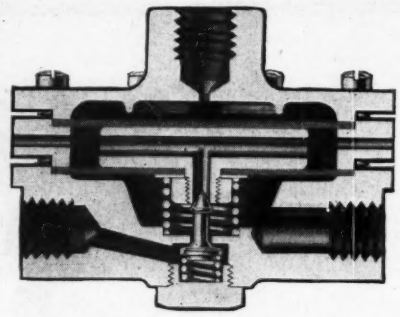
NEW PRODUCTS

Air Relays

Fisher Governor Co., Marshalltown, Ia.

Models: Fisher Air Relays, Type 2601 and Type 2601A.

Application: Operating with an independent air supply, it assures faster process control, by speeding up operation of pilot-operated diaphragm valves and by eliminating lag in long control lines.



Description: Type 2601 has a loading ratio of 3 to 1, providing 3 lb. output pressure for each pound of air pressure variation on the relay diaphragm.

Type 2601A has a loading ratio of 1 to 1 for each pound pressure change on the relay diaphragm, 1 lb. output pressure change will be obtained.

Specifications are: ¼-in. cast bronze body with single seated double acting inner valve construction. Seats are cut in the body and in the upper diaphragm follower. Diaphragm housing, spacer piece and diaphragm head are bronze.

Speed of operation: With a supply pressure to the inlet side of 20 lb., a main valve diaphragm of 107 sq. in. area, and a 2-in. valve stroke, the time required for stroking the valve in either direction would be 10 seconds.

■ ■

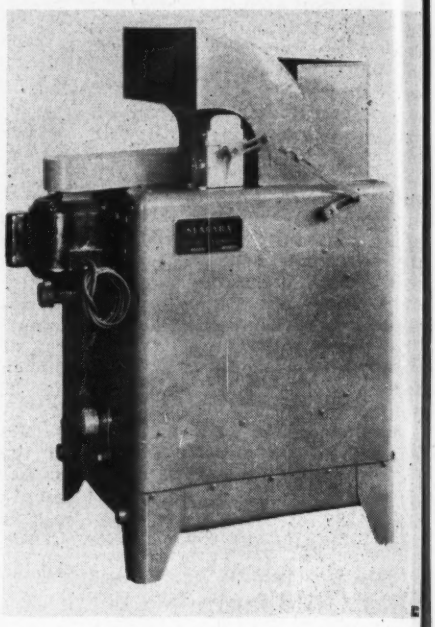
Compressed Air and Gas Cooling Equipment

Niagara Blower Co., 6 E. 45th St., New York 17, N. Y.

Model: Niagara Aero After Cooler.

Application: Equipment for the cooling of compressed air, with resultant drier air and prevention of water damage to pneumatic equipment, such as rapid wearing out of parts because of washing out of lubricants, freezing up of pneumatic tools, damage to work by water in paint spray, or rusting of metallic shot in blast cleaning equipment.

Description: The new Niagara Aero After Cooler for compressed air uses the evaporative cooling principle to obtain the lower temperatures and a new design gives greatly increased capacity in compact apparatus. Air, drawn by a fan through a water spray across coils containing the compressed air, is the cooling medium and temperatures within 10° of the wet bulb air temperature can be maintained. This permits lower



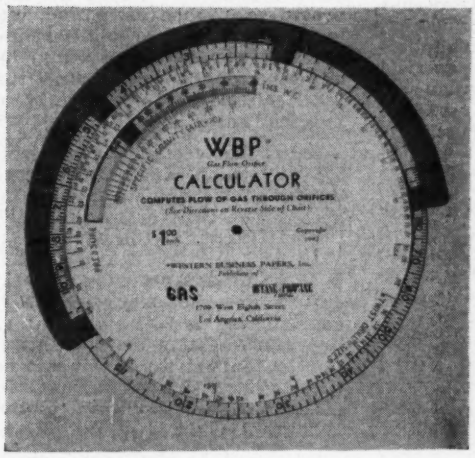
temperatures by 10° to 25° than conventional coolers and produces compressed air that contains only one-half to three-fourths the amount of water formerly experienced with the best practice. The equipment is also applied to gases generated for industrial use.

Catalogs

• **Elmer E. Mills Corp., Chicago,** Ill., has issued a six-page circular on Mills-Plastic tubing and fittings. The Mills-Plastic fittings are of S. A. E. type in sizes of ⅛ in. to ¾ in., and are especially designed for high working pressures and resistance to chemicals, as is the tubing which is available in outside diameters of similar measurement. The circular lists many uses of the product, gives detailed technical data and description of physical properties, showing charts and tables of working pressures. It also illustrates methods for flaring, forming and bending the tubing.

• **Taylor Instrument Co.,** Rochester, N. Y., has issued Bulletin 98170, summarizing its industrial instrument line. The bulletin, entitled "The Taylor Guide to Correct Instrument Selection," is divided according to the variables to be measured or controlled, i. e., temperature, pressure, rate of flow, liquid level, force, position, time cycle and humidity, with an exposition on how the three basic types of Taylor instruments (indicating, recording and controlling) are adapted to suit these variables. Attention is also called to the interchangeable feature of Taylor instruments, and to special function instruments.

W.B.P. Gas Flow Orifice Calculator



How Calculator Operates

To Find Drill Size

1. Rotate movable dial until specific gravity coincides with gas pressure.
2. Rotate movable segment until proper orifice coefficient coincides with desired gas quantity (cu. ft. per hr.). If orifice coefficient is not known, use 0.8.
3. Read drill size on movable dial opposite the arrow (0.8) on the orifice coefficient scale of movable segment.

To Find Cubic Feet Per Hour From B. t. u. Per Hour

1. Rotate movable segment until heating value of gas (B. t. u. per cu. ft.) coincides with gas quantity in thousands of B. t. u. per hour on quantity scale.
2. Read gas quantity in cu. ft. per hour against 1.0 (orifice coefficient scale).

To Find Quantity (Cu. ft. Per Hour) for Given Drill Size

1. Rotate movable dial until specific gravity coincides with gas pressure.
2. Rotate movable segment until arrow (0.8) on the orifice coefficient scale is opposite appropriate drill size.
3. Read quantity (cu. ft. per hr.) against appropriate orifice coefficient. If orifice coefficient is not known, use 0.8.

To Find B. t. u. Per Hour Given Cubic Feet Per Hour

1. Rotate movable segment until 1.0 on the orifice coefficient scale coincides with the gas quantity in cu. ft. per hour.
2. Read corresponding B. t. u. per hour in thousands against appropriate heating value (B. t. u. per cu. ft.).

We pay postage on orders accompanied by remittance. Add 2½% sales tax on California orders; 10% excise tax on Canadian orders.

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GAS
1709 West 8th Street
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SPECIAL OFFER
25% Discount on All Orders of 25 or More

$1.00 Each

Gentlemen: Please send me.....W. B. P. Gas Flow Orifice Calculators, for which I am enclosing check (or money order) for $.....

NAME.....

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REYNOLDS BUILDS AN APPROVED REGULATOR FOR EVERY Gas CONTROL REQUIREMENT!

★ REYNOLDS builds an approved Regulator for every type of Gas Control Installation. Approved by the records of performance in actual operation, or by records of factory tests on new developments, every REYNOLDS REGULATOR, regardless of its field, whether for High or Low Pressure, is not only approved but a proved product.

★ Long Life—Efficient Operation—Accurate Regulation—Reasonable Cost—Low Upkeep—all of these vital features are inherent with REYNOLDS REGULATORS. These features are a development of half a century of experience in developing, designing, building and testing Gas Control Equipment.

For full cooperation of our Engineering Department, Write our Factory, Branch Offices or Representatives.

REYNOLDS PRODUCTS

High Pressure Service House Regulators: Straight Lever Type—Models 10-20 Series. Toggle Lever Type—Model 30 Series.

Low Pressure Service or Appliance Regulators.

District Station Regulators. Single or Double Valve. Auxiliary Bowl and Automatic Loading Device Optional.

High Pressure Line Regulators—Pilot Loaded—Pilot Controlled.

Toggle Type Regulators. Single Valve. Double Valve. Triple Outlet.

Seals: Dead Weight or Mercury.

Relief Valves: High or Low Pressure.

Back Pressure Valves. Automatic Quick-Closing Anti-Vacuum Valves.

Automatic Shut-Off Valves.

Lever Operated Valves.

Louver Operated Device.

Atmospheric Regulators.

Vacuum Regulators.

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Kansas City, Mo.

2nd Unit
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REPRESENTATIVES

Eastern Appliance Company
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Upper Montclair, N. J.

Gas control Since 1892

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U. S. A.

PIPELINE CONSTRUCTION

• **Consolidated Gas Utilities Corp.** of Oklahoma City is seeking FPC consent for the construction of (1) a short line to interconnect facilities at Blackwell, and (2) of a compressor station at Twitty, Texas; and for the replacement of a section of pipeline in Grant County.

• To insure sufficient gas to meet army demands in its Southwest Louisiana district, **United Gas Pipe Line Co.,** Shreveport, is constructing 17 miles of 4-in. and 6-in. line tying the South Elton field in Jefferson Parish and the North Elton field in Allen Parish into the Iowa-Marksville line near Oberlin. Addition of the two Elton fields brings the total tied into the United Gas system to 95.

Primary purpose of the construction was to augment supplies to Camp Claiborne, where estimated peak demand in winter is 13 million cu. ft. daily. Also under construction: measuring stations at South and North Elton fields; a scrubber installation at Oberlin.

• **United Gas Pipe Line Co.** is looping its Katy field line to meet the demand of war industries in the Houston area. The 45-mile line is being augmented by 11½ miles of 12-in. Other installations include a check valve, a meter and regulator station. The enlarged Katy line will have insurance from freezing hydrates through two large dehydration plants: (1) the 60 million cu. ft. diethylene-glycol plant in the Fairbanks field is now completed; (2) a similar 100 million cu. ft. plant in the Katy field is in the final stages of construction.

• The Federal Power Commission has issued a certificate of public convenience and necessity to **the East Ohio Gas Co.,** Cleveland, for the operation of a 120-mile natural gas transmission line in Ohio to augment declining natural gas reserves in the Appalachian area and to avoid drastic curtailment of service, particularly to war industries.

The facilities will consist principally of a 20-in. pipe line approximately 120 miles in length, extending in an easterly direction from an interconnection with Panhandle Eastern Pipe Line Co.'s facilities at Maumee, in Lucas County, Ohio., to East Ohio's Brush Farm valve station in Summit County, between the cities of Akron and Cleveland. Natural gas produced in the Amarillo and Hugoton fields in Texas, Kansas and Oklahoma will be transported by Panhandle Eastern to the Maumee interconnection. From that point, East Ohio will carry the gas through the new line to Brush Farm valve station and thence through existing pipe lines to its local distribution plants.

Under a contract with Panhandle Eastern, dated Feb. 4, 1943, East Ohio will purchase gas at Maumee on a firm basis in amounts of 50,000 Mcf. per day, or 30% of East Ohio's average daily natural gas sales during the immediate preceding 12 months' period, whichever is the lesser and, in addition, up to 50,000 Mcf. per day on a dump basis for a period of five years and thereafter until canceled by either party upon six months' notice.

Estimated cost of the project is $2,868,061, which East Ohio proposes to finance with its own funds, having available either cash or marketable securities sufficient for the purpose.

• Working against odds of cold weather, two crews totaling about 300 men are constructing a 26-in. natural gas pipe line of **the Cities Service Transmission Co.,** to connect the Oklahoma sector of the Hugoton field with the Cities Service major transmission system near Blackwell, Okla.

One crew is working eastward from Harper County, Okla., and the other is laying pipe westward from near Byran in Alfalfa County, Okla. The two expect to meet at a point just west of Alva in Woods County, Okla.

The line will extend 240 miles through northern Oklahoma and will deliver approximately 140,000,000 cu. ft. of gas daily to augment the supply of gas to a large area around Kansas City, Mo.

Construction of the line was authorized May 24, 1943, by WPB. (See GAS, June, 1943, p. 66.)

• **The Hope Natural Gas Co.,** Clarksburg., W. Va., has applied to FPC for authority to construct and operate (1) a 1000-hp. compressor, two high stage gas compressors and appurtenant equipment at its existing Cornwell compressor station located in Kanawha County, W. Va., at an estimated cost of $162,631, and (2) a natural gas dehydration plant, with a daily capacity of handling 75,000 Mcf. of inputs into storage, in connection with its existing Bridgeport gas storage area in Harrison County, W. Va., at an estimated cost of $34,147. Hope proposes to finance the construction of both projects from cash on hand or by issuing new capital stock to Consolidated Natural Gas Co., its parent, at par for cash.

Hope has recently made with the Tennessee Gas & Transmission Co. a gas purchase contract dated Oct. 25, 1943, which provides that beginning between Aug. 1, 1944, and Jan. 1, 1945, Tennessee will deliver into the applicant's transmission system at its existing Cornwell compressor station 75 000 Mcf. of gas per day. The contract further provides that applicant also has the right to purchase 25,000 Mcf. per day of additional gas. Gas will be received, the application says, at 475 lb. pressure and discharged into Hope's existing system at approximately 1500 lb. pressure.

The facilities are needed to receive this additional gas at the southern end of the company's system at the pressure specified and to discharge it northward to vital wartime and regular markets at higher pressures.

Assignment Overseas

Because Klixon snap-acting controls have a date overseas to help blast the Axis, they're not available for the duration. But as soon as Victory is won, we'll be right back in production of Klixon gas valves and thermostats, ready to meet your requirements.

KLIXON

SPENCER THERMOSTAT CO.
Attleboro, Mass.

For a Complete GAS BURNER System
Select
The Mettler "FAN-AIR" Automatic (Mechanical Draft) Assembly

Mettler Entrained Combustion Gas Burners
FOR ALL Purposes Kinds of gas Pressures
BUILT UNDER PATENTS: JANUARY 25th, 1916 JANUARY 2nd, 1923 MAY 26th, 1925 NOV. 4th, 1926
LEE B. METTLER CO.
406 S. Main St. Los Angeles, Cal.

FPC Eases Rules Covering Industrial Gas Contracts

The Federal Power Commission under order No. 107 has amended the provisional rules of practice and regulation under the Natural Gas Act, Part 54, Sec. 54.30, which provides for the filing of industrial rate contracts by natural gas companies. Natural gas companies have been required to file copies of contracts for the direct sale of natural gas to industrial consumers where such contracts involved the sale of 5000 Mcf. per year or more. The order which became effective Dec. 8 raises the minimum to 100,000 Mcf. a year.

FPC estimates that the work of the natural gas companies in complying with the revised order will be only one-third of what it has been, but the contracts filed will cover nearly four-fifths of the volume of industrial gas sales previously covered.

■ ■

OWU Appoints Task Group On Manpower Problems

Appointment of a Joint Task Committee on Manpower to consider the problems of labor shortages and essential manpower supply has been announced by the Office of War Utilities. It is hoped that the new committee may be of real assistance in presenting certain of these problems to other governmental agencies involved, and that a policy may be developed which will afford relief in critical instances.

Natural gas representatives on the Joint Task Committee are: J. M. Herrmann, the Peoples Gas Light & Coke Co.; F. M. Banks, Southern California Gas Co.; J. French Robinson, the East Ohio Gas Co.; and E. V. Kesinger, Natural Gas Pipe Line Co. of America.

Manufactured gas representatives are Ernest R. Acker, Central Hudson Gas & Electric Corp.; Norman B. Bertolette, Hartford Gas Co.; Mrs. Helen S. Steers, Brooklyn Borough Gas Co.; and James D. Dingwell, Jr., Washington Gas Light Co.

■ ■

New Merco Nordstrom Offices Opened in Atlanta

Pittsburgh Equitable Meter Co.-Merco Nordstrom Valve Co. has opened new offices in the Bona Allen Building, in Atlanta, Ga. C. C. Moore, who has been in charge of the Memphis office, is district manager. The offices are located at 411 Bona Allen Building, Spring and Luckie Sts. The Memphis office has been closed, so that all southern operations formerly cleared through Memphis will now be handled through Atlanta.

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Arkansas-Louisiana Gas Co. Buys Hot Springs System

D. W. Harris, vice president and general manager of the Arkansas-Louisiana Gas Co., Shreveport, La., announces the purchase by his company of the natural gas distribution system at Hot Springs, Ark. This addition, bought at a price of $800,000, raises to 107 the number of cities in east Texas, north Louisiana, and Arkansas served by Arkansas-Louisiana.

Oil Terminal Supervisors Needed by Navy

The Office of Director of Naval Officer Procurement, 411 West 5th St., Los Angeles, announces the need of the Navy for officers to serve as oil terminal supervisors.

Necessary qualifications include five years' experience in the handling of bulk fuel oil, including two years in a water terminal storage plant in a supervisory capacity; familiarity with the loading and unloading of large ocean-going tankers. Knowledge of specifications for gasoline, fuel oil, lubricants and aircraft engine oil is desirable. Age limits are 30 to 50 years, and qualified applicants will be commissioned in ranks ranging from lieutenant (jg) through lieutenant commander.

Further information may be obtained at the following offices of Naval Officer Procurement: 411 West 5th St., Los Angeles 13; Bank of America Bldg., 615 Broadway, San Diego; Central Tower Bldg., 703 Market St., San Francisco; 117 Marion St., Seattle.

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Canadian Production Up

Canada's natural gas production for the nine months ended September 30, 1943, showed an increase over the corresponding period of 1942, according to a report from the Dominion Bureau of Statistics in Ottawa. Production for the period in 1943 amounted to 31,592,233,000 cu. ft. against 30,850,037,000 cu. ft. for the like period in 1942.

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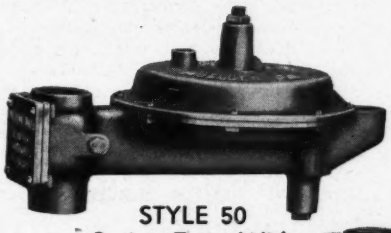
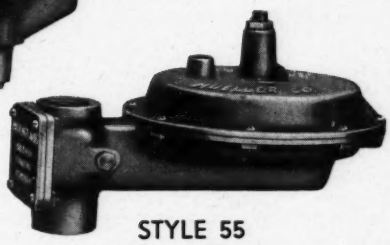
DEPENDABLE ACTION

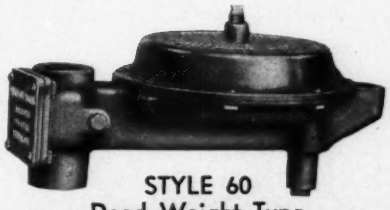


STYLE 50
Spring Type With
Mercury Seal



STYLE 55
Spring Type
Without Seal

Here is a regulator you can install and forget. Day and night it continues to deliver a smooth, even flow of gas at the desired volume regardless of the fluctuations in the inlet pressure. A MUELLER Regulator on the job scarcely ever needs any attention. Built to scientific standards, they perform the way you gas men want them to.



STYLE 60
Dead Weight Type
With Mercury Seal

Mueller regulators come in a variety of sizes and designs—both spring and dead weight type—to fit every pressure control need. Models 50 and 60 shown here have mercury seals. The other two come without seal, but a dead weight or mercury seal may be included in the line if desired. Guaranteed to do the work for which they are recommended, they give long term economy. Gas men everywhere prefer MUELLER Regulators. For complete information write Dept. G-16.

STYLE 65
Dead Weight Type
Without Seal

Los Angeles, Calif. **MUELLER CO.** Decatur, Ill.

International Public Utilities Committee

The formation of a special public utilities committee to assemble information and recommend action concerning requirements, supplies and production of equipment necessary to reestablish electric, gas and water services in liberated and former enemy territories has been announced by the Combined Production and Resources Board.

Chairman of the committee and American member will be J. A. Krug, director of OWU in the WPB. Member for Great Britain will be Sir Henry Self, deputy United Kingdom member of CPRB; and for Canada, Dr. T. H. Hobb, chairman of the Hydro-electric Power Commission of Ontario.

The committee will determine, in conjunction with other operating organizations of the three governments, the production programs necessary to provide equipment for the basic utility needs in areas to be rehabilitated.

It was agreed at the Atlantic City meeting of the United Nations Relief and Rehabilitation Administration that requirements of liberated areas put forward by UNRRA would be referred to the Combined Board for consideration in relation to other military or civilian claims for the same supplies.

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Caloric Announces New Model Gas Range

Production of a new model approved-type gas range will start immediately at plants of the Caloric Gas Stove Works, it is announced by Julius Klein, executive of the firm. Delivery to dealers will begin this month.

Unit production of the new range will equal approximately 40% of the company's unit gas range production in 1941. Both plants of the company have been running at capacity, producing porcelain enamel heating stoves for the armed services and other governmental agencies.

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"Braille" Device for Servel Gas Refrigerator

Because a sightless housewife was having difficulty setting the temperature control on her new Servel gas refrigerator (purchased last August), Customer Service Representative R. J. Humphreys of the Southern California Gas Co. set out to find a temperature control dial that she could use. Finding that no dials but the standard ones were made, Humphreys decided to make a "Braille" dial. So he drilled small holes to the right of each numeral on a standard dial. Into these holes he glued small chrome-plated round head brads, one for the numeral "one," two for the numeral "two," and so on for the rest of the numerals. For the "D" he outlined a letter "D."

The brads do not interfere with the operation of the dial by a sighted person, and a person who cannot see merely has to pass his fingers over the surface and locate the position where the dial should be set for each gradation of temperature.

Last month Humphreys installed the dial on the housewife's refrigerator and found it was exactly what she needed.

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Atlas Lumnite Booklet Available to Gas Engineers

A booklet, "Heat Transmission Through Furnace Walls," has recently been distributed to members of the AGA by Eugene D. Milener, secretary, Industrial and Commercial Gas Section. The set of charts which make up the booklet were prepared to "facilitate the solution of two problems commonly encountered in the design of industrial furnaces:

1. Determination of cold-face temperature and heat loss when hot-face temperature, thickness of wall and conductivities of the material are known.
2. Selection of materials and thickness of wall (of one or more components) to give desired cold-face temperature or heat loss when hot-face temperature is known."

Additional copies of the booklet may be obtained on request from the Atlas Lumnite Cement Co., 135 East 42nd St., New York 17, N. Y.

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Texas Gas to Be Subject of Survey

Chairman Beauford Jester of the Texas state railroad commission announced recently that he would submit for consideration of the commission a proposal to hold a series of hearings to ascertain the availability of natural gas in Texas. The information would be used to determine the state's capacity to produce natural gas in relation to war and domestic needs.

McCarty Co. Names Reed as Pittsburgh Office Head

Establishment of new offices in Pittsburgh, open Jan. 3, is announced by the McCarty Co., industrial advertising counsellors. This expansion is in keeping with the company's conviction that great post-war activity will center around Pittsburgh.

R. S. Reed, Jr.

R. S. Reed, Jr., for the past 12 years advertising director of Pittsburgh Equitable Meter Co. of Pittsburgh, and Merco Nordstrom Valve Co. of Pittsburgh and Oakland, has been appointed manager of the Pittsburgh office. The McCarty Co. has handled the advertising of the Nordstrom concern for 22 years through its Los Angeles and San Francisco offices.

Effective Jan. 3 the Pittsburgh Equitable Meter account will also be serviced by the company's Pittsburgh office, which is located in Suite 2205, Koppers Bldg.

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Army Safety Award to Wisconsin Public Service

Wisconsin Public Service Co. of Wausaw, Wis., was recently awarded the Industrial Safety Flag of the U. S. army for having had the best safe working record of any utility in the state during the first six months of 1943.

The U. S. army safety program aims to increase war production by reducing lost time and damaged work and is conducted in Wisconsin with the cooperation of the Wisconsin Industrial Commisson, the Wisconsin Council of Safety and the Wisconsin Manufacturers Association.

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Calgary Rates Reduced For Trial Period

A reduction in gas rates to consumers of 2c per Mcf. went into effect in Calgary, Alberta, on December 1 and will be continued on trial until June 30, 1944. Approved by the board of public utility commissioners, the agreement to reduce the rates was made between the city and the Calgary Gas Co. During the test period, a civic gas committee will make further inquiries regarding the financial operations of the company and a new agreement will be negotiated before its expiration.

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Southern Union No Longer Holding Company

The Securities and Exchange Commission has granted the request of Southern Union Gas Co., Dallas, Tex., that it cease to be classified as a holding company under the holding company act of 1935. Right was reserved by the commission to void the grant if Southern Union did not divest itself of certain properties under a plan approved by the commission last September.

SEMET-SOLVAY
ENGINEERING CORPORATION

Blue Gas Plants
Water Gas Machines
Washer Coolers
Naphthalene Scrubbers
Gas Purifiers
Condensers
Waste Heat Boilers
Producer Gas Plants

40 RECTOR STREET, NEW YORK, N. Y.